

Native American Cultural Resource Studies at Yucca Mountain, Nevada

Richard W. Stoffle
David B. Halmo
John E. Olmsted
Michael J. Evans

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Institute for Social Research
The University of Michigan
Ann Arbor, Michigan

1990

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To all of these Indian people, the authors would like to express their deepest appreciation and gratitude. Despite the appearance of the four author's names at the front of this report, the vast majority of data inside has come directly from the Native American participants (See Appendix D). To a very real extent, therefore, this is *their* report.

SPECIAL RECOGNITION

Special recognition needs to be accorded to Dan Bulletts, a study team member who has participated in more than a dozen American Indian cultural resource studies over the past decade. Dan is a Southern Paiute person who has observed much in his 86 years. He has been a sheep herder, cowboy, cat-skinner, farmer, Indian doctor, religious leader and, during the past decade, the spiritual and intellectual core of our study team. Because of Dan, more than a dozen tribal governments and hundreds of Indian people have trusted our team to represent their cultural concerns. Dan translates the complex legal and technical aspects of projects into terms that are meaningful from an Indian perspective. During field work, Dan talks with elders in their own language, facilitating recall and providing them with a culturally appropriate atmosphere for identifying and interpreting cultural resources. Teaching in a traditional Indian style, Dan quietly explains both our failures and our successes in cross-cultural communication; then, he provides guidance for improving our research methods. Because of Dan, there are more complete findings and more complete interpretations associated with the Yucca Mountain American Indian study.



Photo 1. Dan Bulletts, Canyon Lands, Utah, 1989



Photo 2. Dan Bulletts, Skull Valley, Utah, 1989



Photo 3. Mike Evans, Death Valley, California, 1988



Photo 4. David B. Halmo, Death Valley, California, 1988

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Foreword

by Richard I. Ford

Ethnobotany as a recognized discipline began at the end of the last century as a static description of uses of plants by what were then called primitive people. At that time most studies investigated plant usages of American Indians as part of the natural history description of the North American continent. The anthropologists and botanists who were the pioneers in this field wanted to record what they thought was knowledge destined to die with the elders of every tribe they studied. So imbued were they with the idea of the progress of the American way of life and cultural attrition in a contact situation that they ignored differential knowledge of plants by gender, social position, or the creativity of the people they studied.

Almost one hundred years have elapsed since the formal beginning of ethnobotany, and the rush to record esoteric plant lore is no longer pressing. We now know that men and women have different knowledge about plants, that young children continue to learn ethnobotanical facts, and that while the ethnobotany of a group may have changed over time, it has not disappeared from any society. Ethnobotany is dynamic and studies the *direct* relationship between a culture and its plant world. It is more than uses; it is the way people interpret their plant environment.

Dr. Richard Stoffle and his research team have brought ethnobotany and archaeology to the service of Native Americans. For decades indigenous people have shared their knowledge of plants, animals, and archaeological sites with western scientists. The dissemination of their cultural legacy had little reward for them, but their previous generosity can now be interpreted as an investment to benefit them. Stoffle's coworkers respect the heritage of the native people who have appreciated the natural and cultural resources of Yucca Mountain, Nevada. They have combined the recorded natural history of previous investigators with new fieldwork to define what Yucca Mountain means to many Native Americans from different tribal backgrounds. In this monograph ethnobotany and archaeology are studied to assist Native Americans to determine their future.

Yucca Mountain symbolizes the cultural diversity and conflicting values in America. To some government officials, state and federal, it is a vast, useless landscape fit only for the toxic waste of modern society. It

has an owner who has the right to define how it is used. To the Southern Paiute, Owens Valley Paiute, Western Shoshone, and other groups of Native Americans in the Las Vegas area, Yucca Mountain is a bountiful harvest of plants, animals, and cultural remembrances. It means food, medicine, religious inspiration, and cultural history. It is a living place without ownership; it is there for all to use as needed. The contrast in attitudes between western civilization and Native America cultures is stark and immediate.

There is not a single ethnobotany for every tribe. The field research conducted by Richard Stoffle demonstrates the wealth of plant knowledge held in a community; not in the head of a single native specialist. While working with representatives from each tribal group, he found some did not know the use or even the name of certain plants. He has preserved in this monograph these diverse experiences with plants common in every society. These multiple viewpoints give texture to the human condition and to the many interpretations of Yucca Mountain.

The field studies by the Stoffle research team reveal important observations about the desert environment. A total of 76 useful plants were field identified by Stoffle's group working with 39 native specialists. Contrary to the 19th century fear that plant lore would be lost, the Stoffle team recorded all the plants Edward Palmer reported in his classic study in 1878. Another plant, a milkweed (*Asclepias speciosa*), is employed today by a Western Shoshone as an insect repellent. This is the first record of this usage and exemplifies why continuing study of ethnobotany is necessary when knowledge about plants is culturally diffuse. This may be a new discovery or simply be one overlooked by previous investigators.

Ethnobotanical studies of a geographic region have many dimensions. The first is temporal. Plant usages do change over time--some are lost, others are added. For the groups who collected plants found on Yucca Mountain the greatest number of plant species used were for food and medicine. Of the 381 plant-specific interviews recorded in the study environment, there were only 15 cases in which identified plants were said not to have been used traditionally by some ethnic groups. With regard to contemporary or current use of plants, the number of cases in which native specialists reported no current use for identified plants increased to 119. The greatest loss in plant use is food, while medicinal plants remain a strong component of the cultures.

The second dimension is intercultural variation. Each culture defines its environment; Anglos ignore the plants on Yucca Mountain, native

people from different tribal backgrounds use great numbers of plants, albeit for different purposes. The Stoffle team found important differences in nomenclature and uses of plants among the four composite ethnic groups who were familiar with the vegetation of Yucca Mountain. When one considers both traditional and current uses of plants, these Native American cultures share the use of only ten plants. Such variability is an exciting discovery because it confirms Stoffle's research procedure to consult many groups on environmental issues and because it debunks the popular sentiment that all Indians use the same plants. Even if one ignores the multi-tribal Las Vegas Indian Center, the number of shared traditional uses of the same species by the other three groups only increases to 20 out of 76 plants.

A third dimension is plant management. Here again the Stoffle team has made a salient contribution to ethnobotany. Too often Great Basin people have been viewed as nomads at the mercy of nature. Yet as reported here they used some nine methods to counteract the vicissitudes of natural plant yield. The Paiutes and Western Shoshone had facilities to store seed from season to season. All dispersed seeds by one method or another, including deliberate planting by the Owens Valley and Southern Paiute. All groups transplanted plants to assure their survival and for the people's convenience. Other methods to assist individually targeted species were cultivation, irrigation, weeding, pruning, and burning. All these methods allowed for increases in yield, higher predictability of availability, and greater assurance for locating species in season. Some of their past efforts continue to this day with the discovery by the Stoffle team of an unusually large population of *Stanleya pinnata* at Tarantula Canyon and the wide-spread distribution of Arizona grape. Moreover, traditional values and methods guide native attitudes about the future of Yucca Mountain. Some want to leave the plants without disturbing them because that is their place on earth. Others saw transplanting threatened plants as an alternative to destruction. And still for other plants no solution to their local demise was proposed. One should expect in a cross-cultural survey a range of opinions about the treatment and future management of plants, and the Stoffle team has recorded these.

Knowledge of plants does vary across generational lines as Stoffle's group found, but there are many ways this lore is perpetuated. Familial inculcation has long been critical and it is today. What is missing now is imitative learning as children rarely go on collecting trips once characteristic of these people. What the next generation will know about

plants is a critical question as modern development expands to endanger the vegetative environment. Yet, the work of Stoffle's team relieves this concern because they discovered about 56% of the people interviewed are currently teaching others about plants, and most of this environmental education still takes place in the family. Contrary to the 19th century misunderstanding of ethnobotany, as long as the family survives knowledge of plants among these Native American groups will continue into the 21st century.

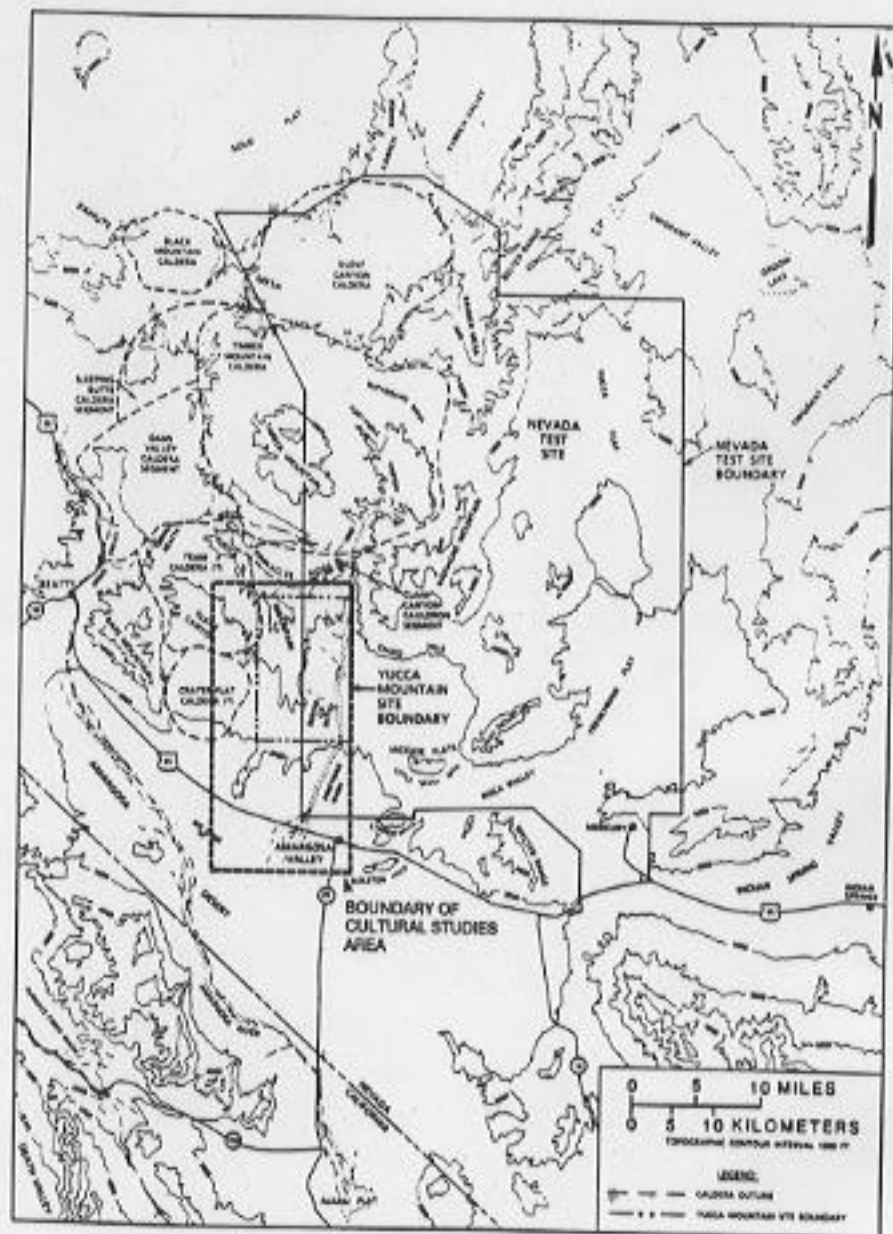
The Stoffle team considered archaeological remains inseparable from natural resources. Each site or site complex is part of a plant environment that also serves as the matrix for an interpretation of the archaeological material by the native consultants. The list of archaeological sites is typical of any scientific report--habitation, ceremonial, burial, trails, hunting related, food processing--but they are also presented with a functional interpretation provided by the native consultants. With these details, site localities that western-trained archaeologists might have overlooked or ignored come to life with new meaning, an alternative interpretation and cultural importance. Just as the plants have a special meaning, the Stoffle team has recorded new significance for the archaeological resources based on an effective dialogue with native people. A very important lesson for all archaeologists is taught in this monograph.

An important lesson is learned from this monograph. Academic disciplines, especially ethnobotany and archaeology, can benefit from a dialogue with Native Americans. They still have much to teach western scientists. At the same time native people need professional assistance. We live in a litigious society. To counteract adverse public policy, court decisions, and administrative fiat Native Americans require the testimony of experts. The courts and government officials will not permit the interesting musings or reminiscences of every impacted Native person. Anthropologists and botanists must learn the point of view of these people, digest their knowledge, and interpret it for judges or administrative officials. The botanical information scientists have gleaned from over 100 years of research must now assist Native Americans to determine their destiny. The Stoffle team's report is a splendid example of archaeology and ethnobotany at work for the people.

CHAPTER ONE INTRODUCTION

This report integrates and summarizes findings from the 1987 and 1988 Native American cultural resource studies related to the Yucca Mountain high level radioactive waste isolation facility. The purposes of the report are to describe the traditional cultural values associated with the Cultural Studies Area (see Map 1), describe the methods used in the research, and provide a theoretical discussion of the role of cultural resources in American Indian groups' past and contemporary society (DOE 1988:3-9).

Findings from these Native American cultural resource studies are presented in what are termed "interim reports." Each of these were submitted for concurrent review by the sixteen involved American Indian tribes, Science Applications International Corporation, and the Department of Energy. This report is based on five reports, including three interim reports. The research study design was reported in *Native Americans and Nuclear Waste Storage at Yucca Mountain, Nevada: Potential Impact of Site Characterization Activities* (Stoffle 1987). The study design was officially presented in *NNWSI Project Environmental Field Activity Plan for Cultural Resources: Native American Component* (DOE 1988). The analysis of archaeological materials was presented in the interim report *Native American Interpretations of Cultural Resources in the Area of Yucca Mountain, Nevada* (Stoffle, Evans, and Harshbarger 1988). Knowledge about the history of the Yucca Mountain area derived from written sources was presented in the interim report *Literature Review and Ethnohistory of Native American Occupancy and Use of the Yucca Mountain Area* (Stoffle, Olmsted, and Evans 1988). Findings about the use of plants by Indian people were presented in the interim report *Native American Plant Resources in the Yucca Mountain Area, Nevada* (Stoffle et al. 1988). The interim reports dealing with Native American interpretations of archaeological and botanical resources were reviewed by archaeologists at the Desert Research Institute and botanists at EG&G Energy



Measurements, respectively. Political leaders from the sixteen involved tribes met to discuss how best to protect these cultural resources and their recommendations were reported in *Recommended Actions for Reducing Potential Adverse Effects on Native American Cultural Resources Caused by Site Characterization Activities* (Stoffle, Evans, and Halmo 1988).

Repository Site Characterization

The Nuclear Waste Policy Act of 1982 proposed a plan to safely dispose of commercial power plant wastes, to conduct environmental investigations, and to involve Native Americans in site selection proceedings. A national search for a site where a high-level radioactive waste facility could be located culminated in the environmental assessment studies recommending three candidate sites for further consideration: Hanford, Washington; Deaf Smith, Texas; and Yucca Mountain, Nevada. When the present study was initiated (July 7, 1987), the DOE was beginning the site characterization activities at all three sites. The Nuclear Waste Policy Act, as amended in December 1987 by the United States Congress, specifies that site characterization studies will be conducted first at the Yucca Mountain, Nevada, candidate site.

Site characterization includes laboratory and field activities undertaken to establish the geologic and hydrologic condition of the site and the ranges of parameters needed to evaluate the suitability of the site as a potential location for a repository. In conjunction with site characterization, environmental studies are being conducted to assess how site characterization activities may affect the environment. These studies will form the basis for actions to minimize any significant adverse environmental impacts. The Native American cultural resources study is part of this environmental research.

Science Applications International Corporation (SAIC), Las Vegas, Nevada, is providing support to the DOE for characterization and environmental research at Yucca Mountain. SAIC subcontracted the Native American cultural resources study to anthropologists from the Institute for Social Research at the University of Michigan.

Background For Native American Involvement

Native American peoples are involved in the environmental impact assessment of site characterization because of the American Indian Religious Freedom Act, the National Historic Preservation Act, and the Yucca Mountain Programmatic Agreement which was jointly produced by the Department of Energy and the Advisory Council for Historic Preservation. Each of these acts or agreements will be discussed in order to better understand the conditions under which Indian people became involved in the cultural resource studies.

American Indian Religious Freedom Act

The American Indian Religious Freedom Act (AIRFA) of 1978 specifically reaffirms the First Amendment rights of American Indian people to have access to lands and natural resources essential in the conduct of their traditional religion. They have these rights even though the lands and natural resources are located beyond the boundaries of a tribal reservation.

In Section 2 of AIRFA the President of the United States is asked by Congress to direct various federal department and agencies to consult with native traditional religious leaders to determine appropriate changes in policies and procedures necessary to protect and preserve American Indian religious practices.

A federal agency task force, chaired by C. D. Andrus, Secretary of the Interior, issued the first set of department and agency responses to AIRFA in 1979 (Federal Agencies Task Force 1979). Section IIC2 contains a summary statement on DOE policy which is briefly summarized here; a full transcript is reproduced in Appendix B. DOE affirms that potential adverse impact on American Indian sacred sites should be considered during the evaluation of DOE projects. The DOE is committed to seeing that the free exercise of religion is protected. Traditional American Indian religious leaders shall be consulted in order to determine whether the proposed DOE action would infringe on their free exercise of religion in any way and to gain an understanding of how such impacts might occur. If consultation indicates that the proposed DOE action may infringe on the free exercise of religion, then DOE will engage in additional consultation with the American Indian traditional religious leaders.

Since the Federal Agencies Task Force report, DOE contracted with Oak Ridge National Laboratory to develop more specific guidelines for compliance with AIRFA (Sharples and Salk 1988). This report was issued in 1988. At this time there is an official DOE policy regarding the involvement of Indian people in agency activities that affect cultural resources (See Appendix C).

National Historic Preservation Act

Among the numerous agency responses to AIRFA (other than DOE) potentially relevant to the Yucca Mountain project, that of the Advisory Council On Historic Preservation (ACOHP) seems to best reflect the intention of the Act. The Advisory Council issued guidelines that were in keeping with the National Historic Preservation Act. In 1985, the Advisory Council issued a draft of its "Guidelines for Consideration of Traditional Cultural Values in Historic Preservation Review." These guidelines were written to incorporate AIRFA into Section 106 of the National Historic Preservation Act. Since these guidelines were drafted, they have been reviewed and termed state-of-the-art by a number of scientists, agency personnel, and American Indian religious and political leaders (Harjo 1985).

The Advisory Council guidelines provide a basis for discussing which Indian people should be involved in the Yucca Mountain cultural resource study. The following passage seems to address a key issue (ACOHP 1985:7):

A property need not have been in consistent use since antiquity by a cultural system in order to have traditional cultural value. A sacred mountain..., for example, might have gone out of use when the Indian group to which it is important was placed on a reservation and converted to Christianity, but have come back into use as part of a contemporary revitalization movement in the tribe; the value ascribed to it would be a traditional one.

It was argued in the preliminary research design (Stoffle 1987) that Yucca Mountain and the area around it were traditionally used and valued by Indian peoples. Indian people continue to value these cultural resources despite physical separation due to encroachment on traditional lands by private individuals and the eventual withdrawal of these lands

from the public domain in order to create the Nellis Air Force Base Bombing and Gunnery Range and the Nevada Test Site.

Yucca Mountain Project Programmatic Agreement

AIRFA and the Advisory Council's guidelines contributed to the Yucca Mountain Project's Programmatic Agreement (PA) which was jointly produced by DOE and the ACOHP. Stipulation 5C of the PA requires that DOE consult with American Indian groups having traditional cultural ties to the Yucca Mountain area prior to land-disturbing activities to assure that significant properties of traditional cultural or religious value are identified and avoided to the extent practicable. Stipulation 5C also states that when such properties are identified and effects on them cannot be avoided, the DOE will consult further with the American Indian groups and others to seek ways to mitigate effects on such properties and will consider recommended mitigation measures. According to the PA, this consultation is to be undertaken with reference to the ACOHP's draft "Guidelines for Consideration of Traditional Cultural Values in Historic Preservation Review." The procedures also reflect agreement about the treatment of cultural resources as specified in a Memorandum of Understanding between the Nevada State Historic Preservation Officer and the Nevada State Indian Commission (January 4, 1979). The Yucca Mountain American Indian cultural resources studies summarized in this report are part of the consultation, identification, and mitigation efforts specified in the PA.

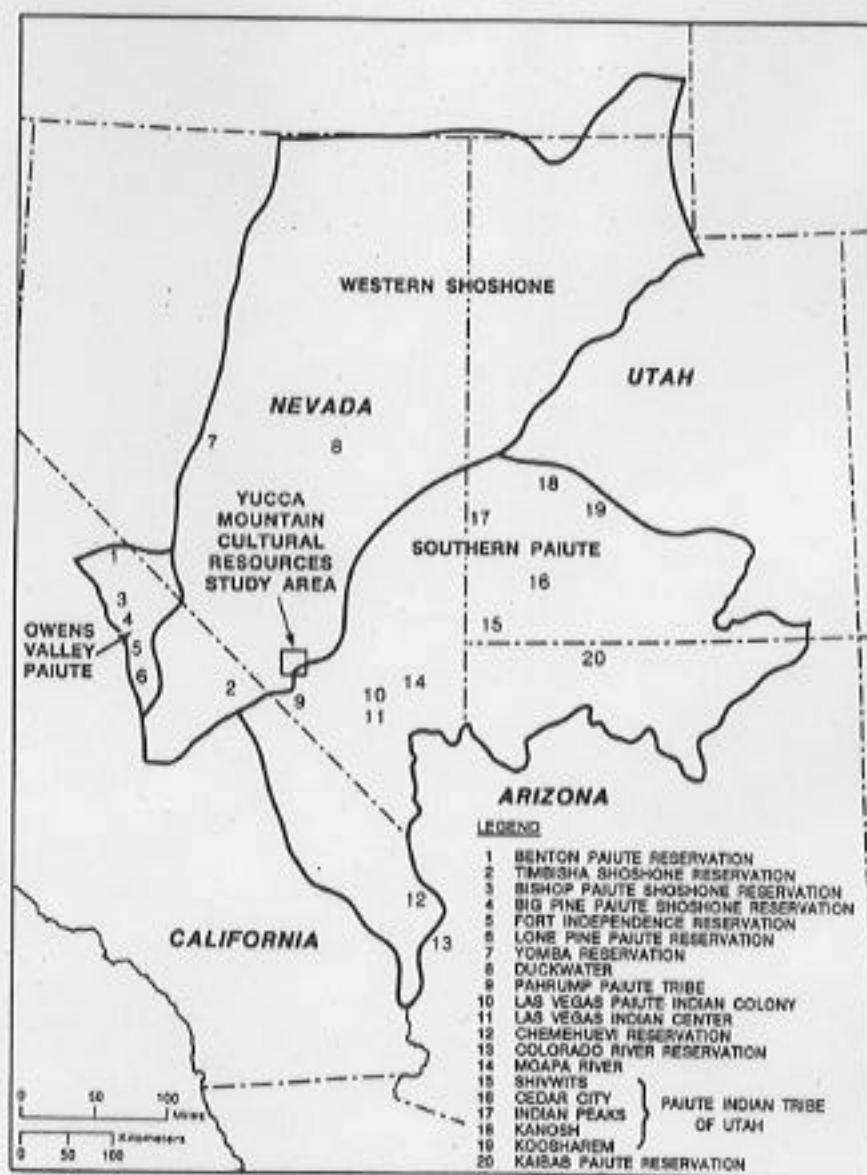
Involved Indian Tribes

The preliminary research design (Stoffle 1987) outlined the ethnic and tribal affiliations of the American Indian peoples who are most likely to have traditional ties to cultural resources located in the Yucca Mountain region. In keeping with that research design, this Native American cultural resource study involved three ethnic groups -- Owens Valley Paiute, Southern Paiute, and Western Shoshone. Ethnographic research experience and an extensive literature review (Stoffle and Evans 1988; Stoffle, Olmsted, and Evans 1988) led to the selection of sixteen Indian tribes that potentially would be involved in the Yucca Mountain cultural resources project because they contain members of the three involved ethnic groups. After meeting with each of these sixteen tribes, all

requested that they be included in the project (see Map 2). The sixteen involved tribes are listed below:

1. Benton Paiute Indian Tribe, California
2. Timbisha Shoshone Tribe, California
3. Bishop Paiute Indian Tribe, California
4. Big Pine Indian Tribe, California
5. Fort Independence Indian Tribe, California
6. Lone Pine Indian Tribe, California
7. Yomba Shoshone Tribe, Nevada
8. Duckwater Shoshone Tribe, Nevada
9. Pahrump Paiute Indian Tribe, Nevada
10. Las Vegas Paiute Indian Colony, Nevada
11. Las Vegas Indian Center, Nevada
12. Chemehuevi Tribe, California
13. Colorado River Indian Tribes, Arizona
14. Moapa Paiute Tribe, Nevada
15. Paiute Indian Tribe of Utah
16. Kaibab Paiute Tribe, Arizona

A consulting relationship with the tribal governments was established so the cultural concerns of the Indian people could be expressed. The quality of this expression is potentially affected by the political and cultural diversity of any given tribe. Three of the sixteen tribes are composed of ethnically and politically diverse peoples. The Colorado River Indian Tribes in Arizona is composed of four ethnic groups: Navajo, Hopi, Chemehuevi, and Mojave. Except for the Mojave, all have come from tribes that have a reservation elsewhere. The Paiute Indian Tribe of Utah is composed of people belonging to only the Southern Paiute ethnic group, but before the new tribe was consolidated the people had been officially recognized as five separate tribes: Shivwits, Cedar City, Indian Peaks, Kanosh, and Koosharem. Most of these tribes still have reserved lands and maintain a right to express independent views regarding certain issues, such as cultural resources. The Las Vegas Indian Center represents the urban Indian population of Las Vegas and Clark County, Nevada. The Indian population served by the Indian Center is ethnically diverse and spatially removed from their home tribal reservations. The cultural



Map 2. Traditional Ethnic Boundaries and Locations of Tribes Involved in the Yucca Mountain Project (adapted from D'Azevedo, 1986).

resource study was designed to adjust for such ethnic and political diversity and there is no evidence that the cultural concerns of any ethnic or political groups is under-represented by the study.

The primary point of consultation was established as being between the project and the federally recognized tribal government or its analog, such as the Board of Directors of the Las Vegas Indian Center. Involvement includes participating in in-depth ethnographic interviews, tribal council presentations, reviews of cultural resource project reports, and visits to the Yucca Mountain study area. Each of the sixteen Indian tribes has been consulted on a regular basis since July 1987. Details of the continued involvement of these sixteen tribes are presented in this report in Appendix A.

Cultural Resources Study Area

The Yucca Mountain cultural resources study area comprises more than 70,000 acres (see Map 1). Each of the cultural resource studies used this as the core study area and branched out as dictated by the nature of the cultural resources or of the information. The archaeology study was most focused on the study area because of the great amount and variety of cultural resources to be identified on and near to Yucca Mountain. The ethnobotany study expanded the study area to include neighboring springs or preserves with protected plant species so that Indian people would be able to identify plants concentrated in one area. The ethnohistory document analysis utilized a regional study area in order to derive the greatest utility from scattered written accounts.

Organization Of This Report

The primary purpose of this report is to highlight major findings and to provide a guide to detailed findings presented in previous reports. The report is divided into six chapters. Chapter One presents background information needed to understand why the study was undertaken. Chapter two explains why Indian people have a different perception of their ancestors' tools, plants, animals, living sites, and burials than do many persons who are professionally trained to scientifically study these cultural resources. This chapter serves as a philosophical overview for understanding information presented in the following chapters. Chapter Three discusses the major events that have influenced American Indian

people who lived in the Yucca Mountain area, as these historical processes can be understood from written documents. Chapter Four is a spatial analysis of Native American cultural resources in the Yucca Mountain area. This chapter incorporates interpretations of cultural resources given by Native American representatives during archaeological and ethnobotanical visits and data from archaeological, ethnographic and historical literature to develop an analysis of spatial use patterns of the Yucca Mountain area by Native American peoples. Chapter Five is a summary of how these Indian peoples traditionally used the plants from the Yucca Mountain area. Chapter Six presents recommendations made by the official government representatives of the sixteen Indian tribes regarding how to best protect the American Indian cultural resources located in the Yucca Mountain area. The research methods, schedule of activities, and analysis of formal interactions that occurred during the research are presented in Appendix A.

CHAPTER TWO INTERPRETING CULTURAL RESOURCES

Native American people representing the sixteen American Indian tribes involved in the Yucca Mountain Native American cultural resource study visited the study area in order to interpret archaeological and botanical resources at locations where cultural resources had been identified by previous archaeological research (Pippin 1984; Pippin and Zerga 1983; Worman 1969) and botanical research (Beatley 1976; Collins, O'Farrell, and Rhoads 1981; O'Farrell and Collins 1984). The American Indian interpretations of these cultural resources were presented in separate interim reports (Stoffle, Evans and Harshbarger 1988; Stoffle, Evans, Halmo, Niles, and O'Farrell 1988).

This chapter is about how Indian people and western scientists interpret and assign significance to cultural resources. The chapter raises issues about all types of cultural resources including artifacts, animals, plants, and even places where historic events occurred. The chapter serves as a philosophical introduction to this report and an overview of how Indian people perceive cultural resources in general.

This analysis focuses on how American Indian people have interpreted the cultural resources left by their ancestors in the Yucca Mountain area. These interpretations are compared and contrasted with those of western scientists who are professionally trained and often legally responsible for interpreting American Indian cultural resources. Professional archaeologists have been selected to illustrate the general points of the analysis; however, potential points of agreement and disagreement exist for other professionals including botanists, historians, and cultural anthropologists. The analysis draws upon other American Indian cultural resource studies as well as archaeological and ethnographic theory.

This analysis is designed to help project managers, and others who establish and implement policy, to understand why Indian people and professional scientists may disagree regarding the appropriate interpretation and disposition of cultural resources. It is important for

project managers to understand the source of these disagreements because often there is no single correct interpretation that can be the basis for management decision. Instead, both professional scientists and American Indian people can be correct, if judged in terms of their own cultural systems. When such disputes are not resolved by the parties, cultural resource managers are forced to choose between equally valid systems of explanation and resource recommendation.

World View: American Indians And Western Scientists

Indian people describe and explain cultural resources in terms of their own culture and their own knowledge. Because their knowledge and culture are different from that of western scientists, there can be differences in how Indian people and western scientists view these resources.

At the most general level, Indian people perceive cultural resources to be part of and integrated into something greater than the artifacts and plants themselves. This holistic frame of analysis derives from an even more general view of the world as being integrated. According to this belief, all of the elements of the contemporary world are functionally integrated; weather, soil, plants, animals, and people being bound together so that a change in one component necessarily modifies other components. Just as the elements of the contemporary world are functionally integrated, so are these elements integrated with work components that existed in the past, before the existence of humans, back to the beginning of time. Indian people express the belief that this timeless, world-wide integration was created by the supernatural.

While all components of the world are perceived as integrated, the exact interrelationship between specific components may not be understood by Indian people. In other words, an Indian person may not be able to explain how one action such as removal of gravel from a pit in one place in the desert could affect another element, like a tortoise who lives fifty miles away from the pit. Despite not knowing about the causal relationship between the components, the Indian person will assert with an assurance, derived from his (or her) epistemological system, that removing the gravel will affect the tortoise.

Western science is based upon an epistemological premise that knowledge about the world and its components derives from evidence that one component is measurably related to another. The evidence of this

relationship is judged in terms of rules which specify the level of confidence that should be placed in the evidence. In general, western science is a body of evidence about how particular components of the world are interrelated, but western science makes few confident conclusions about the world as a whole.

In general, then, western scientists and American Indian people have diametrically opposite views of the world. To western scientists the world as a whole is not confidently understood, but gradually becomes known by analysis of the interrelationships of its components. To Indian people the whole world is confidently known, but the interrelationship between some of the components may not be understood.

Archaeologists and American Indian Interpretations

The epistemological differences can become translated into differences in interpretations of and mitigation recommendations about the same set of archaeological resources. A major difference in world view that can affect the identification and interpretation of archaeological resources is in the size of the study area or analytical frame that is selected.

Occupational Complex Model

American Indian people interpret archaeological resources in terms of what has been termed an occupational complex model (Stoffle, Dobyns, Evans, and Stewart 1984:206-211). The occupational complex model has been abstracted from hundreds of interviews with Indian people participating in more than a dozen cultural resource studies.

The model makes certain assumptions about how Indian people interacted with the physical and cultural resources of an area. The first assumption is that Indian people used large districts and local areas within those districts in terms of an overall district or area use plan. This plan would have contained the major variables of what is being termed the occupational complex model. The use plan would have evaluated these various factors, thus causing one place to be chosen as an occupation site, such as a winter camp or fall gathering or hunting camp, but causing another place with slightly different characteristics not to be chosen as a camp, perhaps designated instead as an animal preserve. Key elements of

the model are (1) holistic analysis, (2) labor efficiency, (3) life-force in nature, and (4) holy lands.

Holistic Analysis. Indian people try to understand the whole before analyzing its components. This analytical approach is in keeping with their view of how the world is integrated. The approach causes them to seek information about an area that often is many miles larger than that specified as the project study area. The appropriate American Indian unit of analysis may be the entire Mojave Desert, as in the case of the Mojave elder who is asked to interpret a trail in the desert (Stoffle, Evans and Jensen 1987). For that elder, the whole desert is connected with trails that passed for hundreds of miles between different Indian groups who had different resources for trade. The trails are remembered in terms of songs that record both the location and the ownership of the trails. So in order to assess one portion of a trail, the elder must know how it fits into the web of trails that traditionally combined people and resources in the desert. The elder is confident that the trail fits somewhere in the overall pattern of trails -- the problem is to determine where.

Labor Efficiency. An important consideration was the evaluation of labor efficiency. Key variables are distance from a central camping area and the functional interrelationship between sites, resources, and natural elements. An ideal camping area combined multiple social and subsistence functions within a culturally defined "reasonable travel distance" from a place where a major camp could be established. The ideal area or region would have provided a variety of game for hunting, topographic features for animals drives, and a diversity of food plants that either existed naturally or could be transplanted near to sources of water. Trees and shrubs should have been available for constructing housing, gathering firewood, and making equipment. High points were needed to provide lookout opportunities as well as places for religious activities. The combination of natural topographic features and rich subsistence base would have permitted Indian groups to remain for longer periods while hunting, collecting, and processing were being accomplished. During this period, important sacred and secular ceremonies could have been conducted.

Life-Force In Nature. Pure efficiency of labor involved in getting to and from needed resources, however, does not fully explain the location and distribution of camps and use areas. The epistemological system of the Indian people and the values and norms that derive from that system influence how they interact with their physical and natural environment.

A key issue for Paiute and Shoshone people is the belief that all of the world contains a human-like life-force.

The creator bestowed upon all of creation a human-like life-force, according to Paiute and Shoshone beliefs. Rocks, mountains, springs, rivers, air, and wind are alive. Plants and animals are not only alive but, like the natural elements, are conscious and willful. Anthropologists have recorded similar beliefs among human groups throughout the world and have termed such a belief system "animism;" that is to say, these people view the world as animated or alive.

These Indian people believe that along with life, the creator bestowed certain human-like rights to all aspects of the world. Among these rights are the following: to have a place to be, to be treated appropriately, to be pleased or angry, to use or not use power, and to use power for or against something else.

"Talk to it" is one of the first normative instructions given by tribal elders when they tell others how to interact with plants, animals, springs, mountains, and wind. Before a plant is picked for medicine, a person must approach the plant with an explanation of why the person is there (that is, someone is sick and in need of curing from the plant) and what is being requested of the plant (Stoffle et al 1988). If a person fails to convince the plant that the request is valid, if the picking is harmful to the plant, or if the proper overall respect is not perceived by the plant, then the cure will not occur because the plant will withhold its medicine. Radioactivity has been interpreted as "the angry rock" by some elders (Stoffle, Evans, and Harshbarger 1988). They argue that it is a powerful rock that was taken without its permission and used for purposes it didn't approve of, so it uses its power against people.

Holy Lands. Indian people believe that they were created in certain areas and given certain rights and responsibilities with regard to the natural resources in those areas. The supernaturally established relationship between these people and their traditional lands has been compared to the Christian and Moslem attachment to origin lands in the Mideast, so the term "holy land" has been suggested to explain this relationship to non-Indian people (Spicer 1957). According to their beliefs, Indian people have the birth-right to use the resources of their holy lands, but they must do so according to certain rules.

A key environmental use rule is to respect rights of plants, animals, rocks, water, and air. This rule will affect the land use patterns. For example, the presence of water in a spring or rock tank would permit a

hunting or gathering camp to be located nearby. Concern for the animals who also use the water, however, results in a general rule against camping next to springs. According to one elder, "if we camped next to the only water in the area, the animals would be frightened away and would die. They have a right to the water just like we do." Similarly, not all seed plants were harvested. According to one elder, some areas were left for the animals. These areas tended to be ones where there was a less attractive combination of plants to gather. Nonetheless, the areas could have been harvested instead of being defined as preserves for the animals.

Spatial Analysis Model

The kind of professional archaeological model that is conceptually and methodologically closest to the Native American interpretive model is called "spatial analysis" (Clarke 1972, 1977). This model, according to Clarke, involves research on the meanings of spatial relationships between places where Indian people lived and used natural resources. Spatial analysis studies include settlement archaeology, site systems analyses, regional studies, locational analyses, catchment area studies, ethnoarchaeology, and distribution mapping (Clarke 1972:47).

Space and its meaning are central aspects of the model. Clarke points out the important role of cultural groups in defining one space as a resource while defining a similar space as unimportant (Clarke 1977:9). Clarke uses the term "resource space" to emphasize that resources have no inherent function or value outside of the ethnographic frame within which a people define their use and establish their meaning.

According to Clarke (1977:10) spatial analysis proceeds through a series of steps. Elements and sites are recognized and mapped. The professional training and experience of the archaeologist permits him or her to appraise the patterns with a "swift intuitive glance," and to form initial working hypotheses regarding the spatial structure of the system. These working hypotheses, according to Clarke, then provide the guidance for further descriptive research and explanatory analysis of the sites, features, and elements within the study area. Spatial analysis can be conducted at a number of levels of abstraction. Clarke (1977:11-15) defines three levels of spatial analysis: (1) micro, (2) semi-micro, and (3) macro.

Micro Spatial Analysis. Micro level analysis is limited to the spatial associations of elements found within or proximal to structures such as

houses, rooms, graves, or shrines. Usually such small scale units of analysis are called "features" and "sites" by archaeologists and are assigned a discrete reference number. Archaeologists who do micro spatial analysis tend to focus on the analysis of archaeological components; that is to focus on distinct, physically small units of analysis like artifacts, fire pits, rockshelters, or activity areas that are clearly defined by stone tools or other lithic markers. The archaeologists usually interpret these archaeology components in terms of previous scientific analysis of similar components. Only after all of the components are understood are attempts made to interpret a larger study area if it can be confidently argued to be related to the understood micro components.

Native American people, at the beginning of an on-site visit, often do not make specific comments when visiting sites, observing features, and handling artifacts. They make personal observations and, like professional archaeologists who are just beginning a visit to a study area, appraise what they observe and then form initial working hypotheses.

Semi-Micro Spatial Analysis. The semi-micro level of spatial analysis is concerned with the interrelationship of structures and elements within a site. It is common archaeological practice to assign a site number to discrete archaeological units, even though they may be near to one another. Thus a rock shelter, a camping area, and a spring surrounded by broken pottery can be located within a few hundred yards of one another but be assigned three site numbers.

When Indian people are asked to interpret the separate elements of a site they often refuse, preferring instead to define the spring, camping area, and rock shelter as a single site. The broader American Indian interpretive frame of analysis is often difficult to integrate with the micro and semi-micro frames of archaeological analysis.

After a number of sites have been visited, Indian people begin to make more extensive site interpretations. These interpretations usually are presented to the ethnographer with the understanding that they are based on working hypotheses regarding the site and area and on the condition that the interpretations can be modified if visits to other sites modify the working hypotheses.

Macro Spatial Analysis. The macro level of spatial analysis is most comparable to that used by Native American representatives during various on-site visits. This level of analysis involves the interrelationship of sites, sets of sites, and locations (Clarke 1977:13-15). Flannery (1976:91-95, 103-117), for example, utilizes the "catchment area model" to refer to

the zone of resources, both wild and domestic, that occur within a reasonable walking distance of a given agricultural village in Mexico. The model suggests that it is the food production potential of an entire catchment area that influences the development and function of sedentary living areas, rather than the food production potential of the sedentary area itself. Flannery's model and other catchment area analyses (Vita-Finzi and Higgs 1970) and the "least cost" locational models of Von Thunen (1826), Weber (1909), and Chisholm (1968) rely upon economic and geographic variables.

Economic and geographic variables are important aspects of the Native American occupational complex model, but the model also includes cultural and historical meanings assigned to natural resources and features of the area. American Indian people assign meaning to places that are involved with (1) their creation as a people, (2) religious stories, (3) burials, and (4) significant secular events. Therefore, the definition and use patterns of a catchment area and its components are influenced by cultural values as well as the functional interrelationship of its components and their food production potential.

The type of spatial analysis that has the potential for adding cultural value variables to the evaluation of an area is termed "ethnoarchaeology" (Binford 1978; Donnan and Clewlow, Jr. 1974; Gould 1978; Kent 1984; Kramer 1979, 1982). Ethnoarchaeological studies combine ethnographic studies of contemporary American Indian people with archaeological data in order to interpret spatial relationships, uses, and values of sites that had been used by the ancestors of contemporary Indian people. Most studies involve an archaeologist and sometimes an ethnographer making firsthand observations of contemporary Indian life ways and then extrapolating these findings to the archaeological data.

Kent's research (1984:15-18,39) took the basic ethnoarchaeological methodology two further steps. First she added the strength of controlled comparisons by simultaneously observing an economically stratified sample of Navajo, Spanish American, and Anglo American families to determine how they utilize household space and surrounding activity areas. Then she asked Navajo people to interpret archaeological data from an archaeological excavation.

The direct involvement of Indian people in the interpretation of archaeological sites and areas is becoming more and more of an accepted practice. Indian people often have an active role in interpreting archaeological data when the sites are from the recent historic period.

Bunte and Franklin (1984, 1987) have worked with San Juan Paiute people to document the location, occupational function, and cause for abandonment of hundreds of former San Juan Paiute living areas. These Indian people have accurately interpreted living areas abandoned as much as a generation earlier: delicate features, such as an impression in sand from a circle dance; and potentially confusing sites, such as where a whole hogan has been moved after a death. The function and meaning of these features and sites are ultimately understood in terms of their contribution to large-scale San Juan Paiute occupational complex units. Such evidence has been defined as admissible in federal courts and as part of a federal tribal acknowledgement petition (Bunte and Franklin 1984).

Summary

Data used in this analysis suggests that Indian people are likely to make archaeological interpretations based on a model termed here the "occupational complex model." These interpretations stand in greatest contrast to archaeological interpretations that focus on the smallest physically discernable units; such analysis is termed "micro" or "semi-micro" spatial analysis (cf. Clarke 1977:11). The American Indian interpretations are most comparable with archaeological interpretations that focus on the interrelationship of artifacts and sites as they exist over a large local area or region; such analysis is called "macro spatial analysis" (cf. Clarke 1977:11). Professional archaeologists are able to add cultural meanings to their spatial interpretations based on subsistence strategies, when living Indian people share the task of interpreting the artifacts, sites, and region under analysis. Thus there is a theoretical middle ground for finding compromises between archaeologists and American Indian peoples.

Professionals who study the interactions between how people organize themselves to survive in an environment and how they perceive the universe to be organized, debate whether or not one causes the other. In the case of the Indian people involved in the Yucca Mountain cultural resource assessment, it is clear that a belief about the cosmological integration of the elements of the universe is in keeping with the adaptive strategies for interacting with the environment.

There are a number of reasons why the occupational complex model is important. First, the model demonstrates that Indian people developed adaptive strategies that permitted them to control their environment,

while not violating basic beliefs about the universe. This point stands in contrast with theories that interpret Great Basin people as having social and cultural systems that were dictated by their environment. Second, the model demonstrates that when Indian people are asked to interpret cultural resources, they prefer to understand the broader context before making artifact-by-artifact or site-by-site interpretations. Finally, the potential effects of a project on cultural resources must be judged in terms of analytical units that have meaning to American Indian people rather than simply on sites or artifacts that are components of those larger units.

Rules Of Evidence: What Is Valid Knowledge?

Archaeologists sometimes do not accept the interpretations and mitigation recommendations of American Indian people with whom they are working to assess cultural resources. These differences have become so common and so important to both Indian people and professional archaeologists that special conferences have been organized to help articulate the points of disagreement and to seek resolution (cf. Quick 1985).

Perhaps one of the most fundamental issues dividing archaeologists and American Indians is that they may not agree on the rules of evidence that apply to cultural resource studies. At the most general level this disagreement can derive from epistemological differences about what knowledge is, as has been discussed above. Sometimes, however, Indian people and archaeologists simply do not believe that the other has reliable or valid knowledge for interpreting cultural resources.

Indian people often express the belief that knowledge about cultural resources can only derive from being a member of an ethnic group or, as in the case of interpreting certain ceremonial areas, revealed by the supernatural. Unless the archaeologists belong to the ethnic group or can communicate with the supernatural, they have no access to either source of knowledge and, therefore, do not know about cultural resources. Some archaeologists express the belief that knowledge about cultural resources can only derive from the scientific study of the artifacts, because the people who made and used the artifacts are long since gone. So, unless the Indian people have received professional training as archaeologists or personally have observed the artifacts being made or used, they do not know about the cultural resources. Some archaeologists have taken the

formal position that before Indian people are permitted to interpret archaeology sites they must provide evidence that they had actually been on the site before or participated in the production of artifactual materials located there.

Data are factual information used as a basis for reasoning, discussion, or calculation. The sources of scientific data are widely understood by most Euroamericans inasmuch as the scientific method is taught in most U.S. public schools. The sources of data used by American Indian people to identify and interpret cultural resources are less widely understood, so they are reviewed here.

Indian people have at least three sources of data that can be used to interpret archaeological remains that are older than the experience of any living Indian person: (1) supernatural communication, (2) traditional information that is passed orally from generation to generation and (3) a culturally-based logic.

Supernatural Data

American Indian people have religious systems that permit them to communicate with both the natural and supernatural components of the world. Paiute and Shoshone people believe that all natural elements (air, water, rocks, plants, and animals) of the universe have a human-like life form. Proper interaction with these elements involves respecting their right to be in a place and make certain demands upon humans who desire something from them. If the humans do not follow these rules, the elements can respond in a negative fashion. Plants can withhold medicinal power or even make the patient sicker. Mountains that are not fed may make a person lost. Rivers can give or take a life. A traditional theory of radiation derives from an interpretation that powerful rocks, like uranium, can even become angry if they are taken and used inappropriately (Stoffle, Evans and Harshbarger 1988).

Communication between living people and a deceased person is possible. It tends to be accomplished by religious leaders because of the danger involved to the person making the communication. Religious leaders can travel from this world to the next world which contains Indian people who have died. Religious leaders often do this during a burial ceremony in order to bring back a message to assure relatives of the deceased that he or she believes the burial ceremony paid sufficient respect and that the deceased is content to remain in the next world.

Indian people who are asked to interpret cultural resources and the areas where these are located may come to understand about these things by talking with them. A plant may be asked about the powers it has. A place may be asked about what event of importance to Indian people occurred there. A burial may be asked what tribe it came from and what it wants to be done if the project were to disturb it. Natural and supernatural communication are commonly used and culturally acceptable means for understanding about plants, animals, rocks, places, and burials.

Oral History Data

For thousands of years, Indian ethnic groups have orally transmitted their knowledge. Great Basin people, including the Shoshone and Paiutes, focused much of their attention on where to locate various natural resources and how to utilize them in ways that maximized the utility of the resource but did not violate the basic rights of the resource. Researchers have suggested that an intimate knowledge of plants was a cultural focus for these and other desert peoples (Anderson 1956; Shipek 1970).

Careful triangulation with original documents, archaeology research, and geology research has led professional cultural anthropologists and historians to the conclusion that Indian people (as well as other people who have strong oral traditions) are able to make accurate statements about things and events that were made or occurred long before the people were born (De Laguna 1958; Krech 1980; Montell 1970; Opler 1940; Pendergast and Meighan 1959). Euler (1967) demonstrated that one Paiute person provided fundamentally identical oral history responses (92% correlation) in two ethnographic interviews that were conducted 49 years apart. Federal courts, especially during Indian Claims Commission hearings, have permitted the use of interpretations based on oral traditions (Dobyns and Euler 1970; Heizer and Kroeber 1976; Shipek 1970, 1982). These studies independently document the potential validity of oral data for the interpretation of archaeological resources.

Culturally-Based Logical Data

Cultural systems are structured so as to permit ethnic group members to identify and interpret natural resources and areas that, to some extent, are beyond the experience of the observer. Plants, for

example, vary in size, shape, and color, depending on the ecological zone where they grow. The ethnic group member is provided by her (his) culture with classificatory systems within which all plants can be classified. Thus an individual faced with a plant that seems similar, but not exactly like a plant that she (he) has experienced, can at least utilize general criteria to place the plant in a class with other plants. Once classified, the Indian person has procedures for testing the plant and evaluating the physical risks associated with using the plant.

In a similar manner, Indian people interpret new archaeological data in terms of traditional classificatory systems and the broader environmental and site context of the data. An arrowhead is different than a spearpoint and both are not like grinding stones. Thus Indian people do not have to have personal experience with a specific artifact in order for them to give a culturally-based logical interpretation of the artifact.

Summary

Rules of evidence that deny data derived from scientific research, supernatural communication, oral history, or cultural-based logic effectively eliminate joint cultural resource studies by archaeologists and American Indians. However, for many archaeologists and American Indian people there is a common ground where each accepts less exclusive criteria for providing evidence. American Indian people have accepted that professional archaeologists understand many things about traditional cultural resources. Archaeologists have accepted that cultural knowledge is a basis for knowing about artifacts produced by other people at other times. While the rules of evidence can be more inclusive, past experience suggests that both parties are equally concerned with accurately interpreting cultural resources, so the criteria for evaluating the evidence should remain stringent. For example, the ethnic identity of excavated burials should be accurately established because American Indian people do not want to rebury on their reservation the bodies of other ethnic groups' members and archaeologists want their burial observations to contribute to the scientific study of particular ethnic groups. With the mutual acceptance of each other's theories of knowledge, archaeologists and American Indian people have a basis for making common interpretations and recommendations regarding the protection of cultural resources.

Cultural Significance: Who's To Decide?

In order to establish the significance of some item in a cultural resource inventory, there must be some reference to a system of values. All values are related to an epistemological system that is held (or was once held) by a human group. Therefore in order to compare and contrast how American Indian people and western scientists assign value, it is necessary to discuss their value and epistemological systems.

Academic Significance

Western scientists attempt to conduct value-free research. By this they mean their own cultural backgrounds should not be a factor in how they define their research problems, their methods of gathering or analyzing data, or their interpretations of the data. Scientific research is ideally driven by problems that are taken from professionally defined frontiers of knowledge and research that is conducted by the objective rules of science. Some of the epistemological underpinnings of this system have been discussed above. Although scientific research strives to be value-free, it is designed and conducted in terms of inherent values.

Scientifically significant research topics are ones that can contribute to some frontier of knowledge as this is defined by the community of scholars who specialize in a particular topic area. Scientifically significant findings about these topics are ones that (1) test existing assumptions about a topic, (2) can be replicated by new studies and can themselves be tested, and, as in the case of quantifiable data, (3) can be shown by statistics not to have occurred at random. The system reflects a number of premises, especially those having to do with the rules of evidence.

Scientists who study American Indian cultural resources select topics for the collection of data, choose models for analysis of the data, and make interpretations. A recent analysis, for example, evaluates the significance of Native American botanical resources (Turner 1988). The study attempts to assign survival value to certain plants. On a five point scale, where one is minimal and five is maximum, this analysis assigned a value of five to plants that contribute directly to the nutrition of Indian people whereas plants used in religious ceremonies are assigned a value of one. Within this model of evaluation, the physical survival of the Indian group is deemed five times as important as the religious survival of the

Indian group. This is a point that will be contrasted later in this discussion with the ethnobotanical perceptions of Indian people (see also Stoffle et al. 1990).

Regulatory Significance

Laws and regulations establish criteria for determining which cultural resources are significant. Federal and state agencies often must conduct American Indian cultural resource studies because regulations or laws require that they do so. Such laws caused the present study to be conducted. Because the research problem and process are specified by an agency located beyond the university, such research is called applied or contract research.

When scientists accept a contract to conduct research for an agency, they receive their research topic from the contractor. As scientists, however, they reserve the right to follow the rules of research and professional ethics for conducting research. The significance of the research findings, however, tend to reflect legal or regulation criteria rather than the criteria of being on a frontier of science.

Botanical research, for example, that is conducted during an environmental impact assessment tends to be assessed in terms of how rare or endangered are plant or animal species. The criteria are specified in the Rare and Endangered Species Act. This act specifies that plants and animals that are rare or endangered as a species are more significant than ones that are not endangered and so the former deserve special protection and consideration when evaluating the potential impacts of a proposed development project. According to these criteria, significant adverse impacts tend to be limited to animals and plants that are especially identified by the Rare and Endangered Species Act.

American Indian Significance

American Indian people evaluate the significance of cultural resources in terms of three points of reference (1) individual, (2) tribe, and (3) ethnic group. At the individual level, one can generally expect to find the greatest degree of variation in assessments of significance. Individuals often hold diverse attitudes about the significance of particular resources and their disposition in the event of disturbance. Variations in individual attitudes can derive from differences in knowledge about the

resource. For example, men may know more about animals that are hunted than women, and women may know more about basket plants than men. Each will tend to express most concern about those cultural resources about which they have the most knowledge and for which they have a more directly cultural responsibility. Indian people who lived in one area may feel more attachment to that area than another where they have only visited.

Some cultural resources, such as burials, are uniformly assigned high significance by all individuals. If a burial might be disturbed, Indian people tend to recommend that the burial be avoided. Geographic areas or places in particular tribal or ethnic territories are similarly accorded high significance by the vast majority of individuals.

At the tribal and ethnic group levels, there can be variations in assessment of significance, even among tribes who belong to the same ethnic group. These differences may be attributed to people belonging and being identified with local and regional territories. Like individuals, people from a certain area tend to be more protective to the types of cultural resources located there. For most issues, however, these local or regional differences in cultural resource assessments are "pooled together" so resulting tribal assessments of cultural resource significance reflects a majority, or communal consensus.

While tribal units of the same ethnic group, as well as those of distinct ethnic groups, may vary in their assessments of cultural resource significance, there tends to be general agreement. This mutual agreement regarding the significance of cultural resources is often a basis for pan-Indian agreements regarding the disposition of traditional cultural resources. In the final analysis, Native American individuals, tribes and ethnic groups realize the necessity for protecting traditional cultural resources, many of which have been removed from their control since contact with European and later Euroamerican colonists. These resources are symbols of an ethnic group and general American Indian identity and history. Moreover, these resources have, according to Native American ethnic religious doctrine, been set aside by the Creator for use, sustainable management, nurturing and protection by Indian people.

Conclusion

The analysis suggests that cultural differences between American Indians and western scientists are partially responsible for cultural

resource disagreements. These cultural differences range from abstract beliefs, such as what forces exist in the world, to more specific norms, such as what rules should govern the treatment of human burials. Disagreements even occur over theories of knowledge; that is, American Indian people and western scientists can disagree about what qualifies as evidence for interpreting cultural resources.

Common goals, however, can stimulate compromise between American Indian people and western scientists. Especially important is the goal of preventing cultural resources from being vandalized, inappropriately used, hunted to extinction, or endangered by over harvesting. Another goal is the concern for future generations to have access to the cultural resources, whether this is accomplished by leaving the resources protected in place or curating them in a museum or herbarium. At a most abstract level, western scientists and American Indian people respect cultural differences and share the goal of living in and support for a world where cultural pluralism is encouraged.

CHAPTER THREE

ETHNOHISTORY OF NATIVE AMERICAN PEOPLES IN THE YUCCA MOUNTAIN REGION

Euroamerican impacts upon North American Indian societies began in the 16th century. The timing and the characteristics of the advancing frontier of Euroamerican settlement varied greatly from one part of the continent to another. Native American people in the southern Great Basin were among the last to experience invasion by the Euroamerican frontier. In this region the first direct interactions between Native Americans and Euroamericans did not occur until the late 18th and early 19th century. In the region of the Nevada Test Site there was still only a scattering of Euroamerican settlers as late as 1900; Native Americans still outnumbered Euroamericans in 1900, according to the census for this part of Nevada. Beginning in 1904 a number of mining boom towns sprang up near the Nevada Test Site and there was an explosion of the Euroamerican population. Then, within a decade, the mining boom turned to bust, the towns quickly depopulated, and some three decades of relatively slow development followed. World War II and the withdrawal of large areas of southern Nevada for military uses in the 1940s ushered in another period of dramatic changes affecting Native American people.

Over the span of only a few decades, then, Native American people in this region were involved in several dramatically different phases of interaction with Euroamericans, involving different patterns of competition for resources and different strategies of cultural adaptation. Native American people in the region developed a complex three-pronged adaptation in response to Euroamerican settlement and development. In remote "refuge areas" they were able to continue their traditional patterns of wild food harvesting; they continued to practice small scale cultivation of traditional crops (as well as new crops) at a reduced number of springs; and they worked as wage laborers for Euroamerican employers--at first working for Euroamerican ranch owners and later as laborers based in the mining boom towns. In the region of the Nevada Test Site (NTS), Indian people played a major role in the development of farming,

ranching, and mining. At the same time, traditional patterns of wild resource harvesting persisted well into the 20th century. Native American people were still harvesting wild food resources and medicinal plants in the area that is now the Nevada Test Site at the time this area began to be withdrawn from public use during the 1940s.

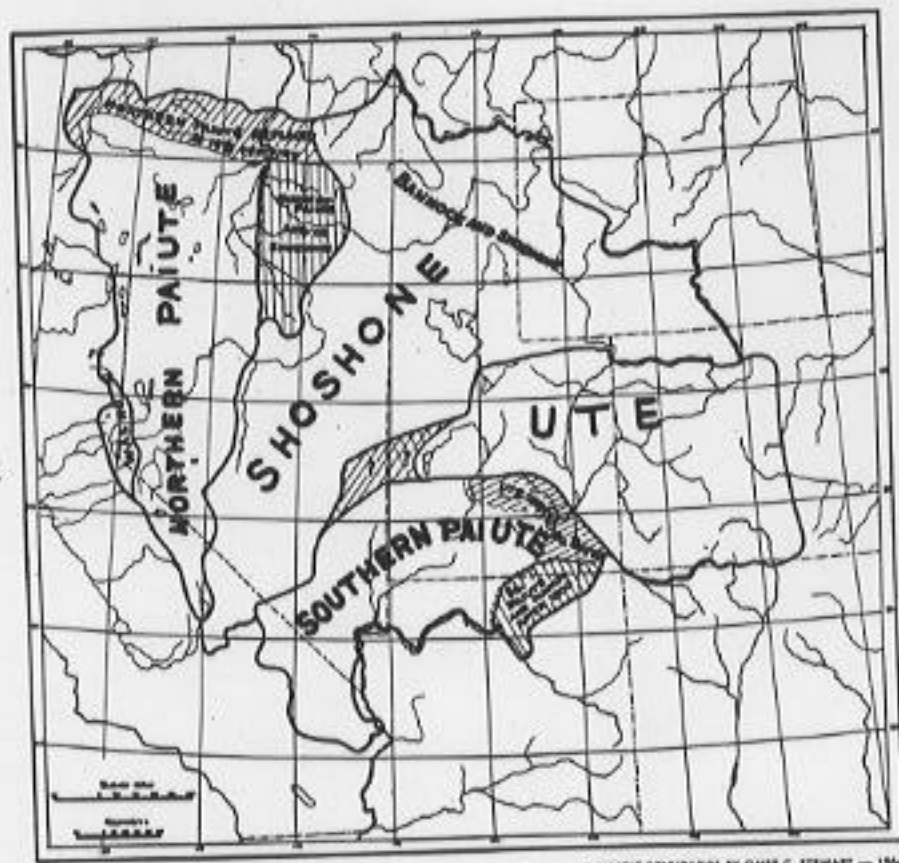
This chapter traces the history of Native American people in the region of the Nevada Test site since contact. The chapter summarizes more detailed findings presented in an interim report, *Literature Review and Ethnohistory of Native American Occupancy and Use of the Yucca Mountain Region* (Stoffle, Olmsted, and Evans 1988).

While the site characterization study area for the proposed nuclear waste repository encompasses only a limited area around Yucca Mountain, it is clear that from a Native American perspective and within the context of Native American history the Yucca Mountain area cannot be seen in isolation. An understanding of Native American occupancy and use of the Yucca Mountain area has required that a much larger region be encompassed in the analysis. Native American people in the Great Basin traditionally used extensive territories and were organized in ethnic groupings or "nations" with "national" political organization and extensive homelands. Yucca Mountain was part of a much larger pattern of uses that extended over a large region. While there were permanent Native American villages, rancherias, and individual family residences at the springs and rockshelters within the area (Steward 1938:93,95) much larger numbers of Native American people used the area on a temporary or seasonal basis.

Traditional Paiute and Shoshone Adaptations in the Region

Both Southern Paiute and Western Shoshone people traditionally inhabited the region of the Nevada Test Site. The traditional boundary between Western Shoshone and Southern Paiute territories passes through the Nevada Test Site (Kelly 1934; Stewart 1938; Pippin and Zerga 1983; see Maps 2 and 3).

The southern Great Basin is arid on the whole, but there are important oasis areas around springs and along watercourses, most of which are ephemeral. Paiute and Shoshone people in the region developed a "transhumant adaptive strategy" (Stoffle and Evans 1978:5) that involved the harvesting of a great diversity of plants and animals over the course of a complex annual cycle that involved period travels



LINGUISTIC BOUNDARIES BY OMER C. STEWART — 1964

Map 3. Linguistic Boundaries in the Great Basin
(from O. C. Stewart 1964)

throughout an extensive territory. This transhumant adaptation optimized the carrying capacity of the desert environment by spreading resource use over a wide range of species.

Most families and larger social groupings made their primary residence at an oasis location. The bulk of the population made their primary residence in core areas where there were abundant springs, capable of supporting a number of Native American villages in close proximity, as in Oasis Valley, Ash Meadows, and Pahrump Valley. Smaller numbers of people lived at more isolated springs, as at numerous locations in the Nevada Test Site.

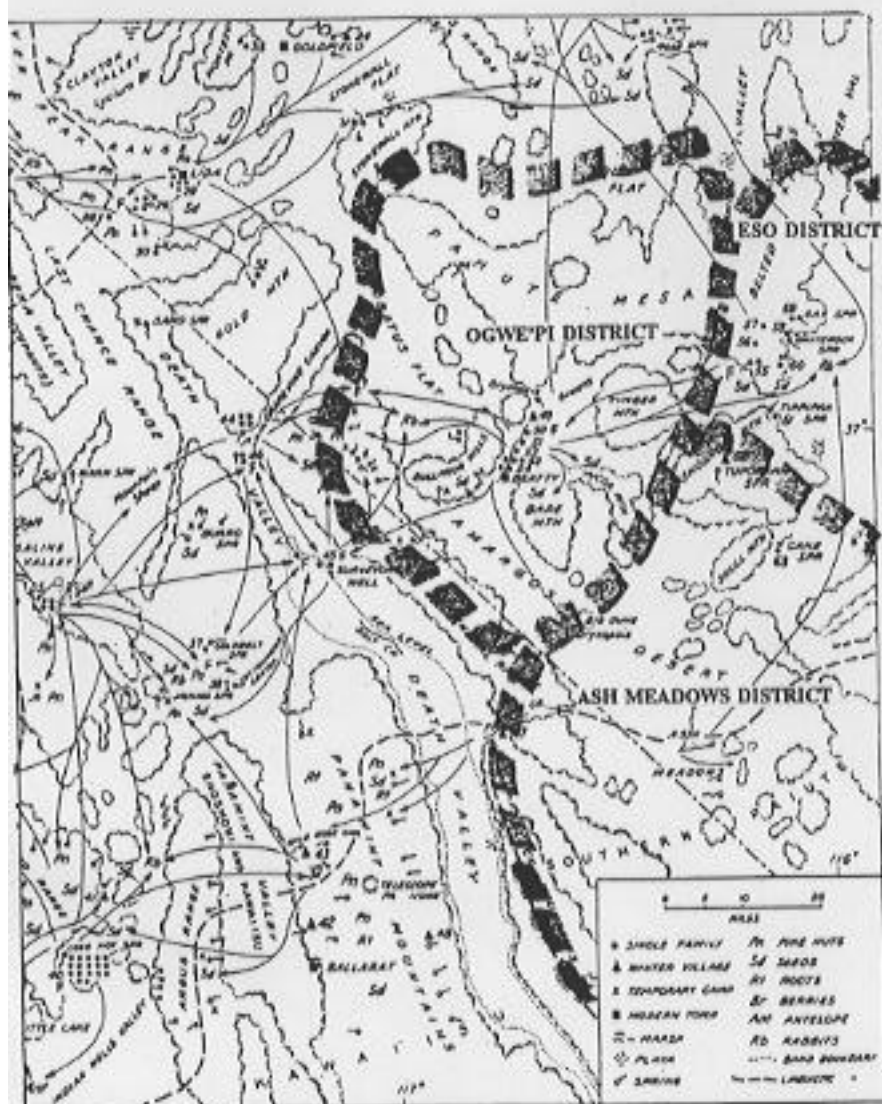
At core oasis locations, including Ash Meadows, Pahrump Valley, and Pahranaagat Valley Southern Paiute people cultivated maize, squash, and other crops. Several of the earliest traveler reports from southeastern Nevada, as well as the earliest official surveys, document the practice of aboriginal agriculture involving corn, squash, beans, and other indigenous grains and rootcrops by Paiute people in the region (Smith 1977:57, 59, 64; Hafen and Hafen, 1954:VII:244; Fowler and Fowler 1971:283; Lawton et al. 1976:21-27; Wilke and Lawton 1986:47). The earliest official survey of Owens Valley (in 1859) documented extensive irrigated cultivation at some dozen locations within the valley (Wilke and Lawton 1986:19,28,29), involving local species of plants in addition to maize and squash. The earliest known Euroamerican travelers through the Nevada Test Site (in 1849) stopped at a rancharia where Native Americans cultivated corn and squash (Manly 1928:15,153,156,157; Belden 1954:64; Johnson and Johnson 1987:59).

From their primary residences in core oasis areas, people travelled to temporary seasonal camps to harvest pinyon nuts, wild seeds and grains, medicinal plants, and game. People harvested in defined territories whose usufruct belonged to a particular band or family grouping. Within the Nevada Test Site there were several small permanent villages and family residences at springs and rockshelters; aboriginal horticulture was practiced on rancherias at Cane Spring and Indian Springs and perhaps at other springs as well. During the fall harvesting season, much larger numbers of people occupied seasonal camps in the area while harvesting pinyon nuts, seedgrains, deer, rabbits, and other species of plants and animals.

Families, extended families, and groupings of villages (referred to here as district groups--see Chapter 4) occupied and used extensive territories and conceived of their home not as a single localized site but

as an extensive territory encompassing many kinds of use areas and a number of temporary harvesting camps in addition to a primary residence in an oasis area. Three district groups had harvesting territories within what is now the Nevada Test Site (see Map 4). The *Ogve'pi* people, whose primary residences were in the Oasis Valley with its abundant springs, had harvesting territories that included the Yucca Mountain area, as far west as Fortymile Canyon, at least as far east as the Grapevine Range and apparently shared the use of Pahute Mesa (Steward 1938). The *Eso* people, whose primary residences were at springs and tanks in the vicinity of White Rock Spring had harvesting territories in Yucca Flats, the Belted Range, Rainier Mesa, and the flats north of Fortymile Canyon (Steward 1938). Ash Meadows people, whose primary residences were at the numerous large springs in Ash Meadows, had harvesting territories as far north as Shoshone Mountain, as far east as Big Dune and the Funeral Mountains, and as far west as the Black Mountains (Steward 1938).

People's ties to the land, and their use of resources, extended even beyond that of the local district where they made their primary residence and had their closest kinship and social ties. People had widespread kinship and political ties to other local groups. They travelled extensively beyond their own territories to visit relatives, to engage in trade, to share in the harvesting of resources on a reciprocal basis, and to participate in major social events organized on a regional basis. Harvesting territories were often shared to alleviate annual variations in productivity. A group whose territory produced a poor pinyon nut crop in a particular year, for example, would be permitted to harvest jointly with a group whose pinyon nut crop was abundant. In the fall, people throughout an extensive region came together for cooperative rabbit drives and plant food harvesting, followed by the major festival social occasion of the year. Several valleys within the Nevada Test Site were important sites for fall rabbit drives (Steward 1938:97). One of the regular patterns of travel and exchange involving the *Ogve'pi* people of Oasis Valley was their participation in fall rabbit drives, and harvesting of wildgrains and pinyon nuts with people in the *Eso* district--in the vicinity of White Rock Spring--and participating in a five-day fall festival there. The *Ogve'pi* (Oasis Valley) district and the *Eso* (White Rock Spring) district hosted the fall festival, the major social event of the year, in alternate years. Not only people from these two districts participated, but also guests from Ash Meadows and more distant places (Steward 1938:90,98,183).



Map 4. Native American Patterns of Use
in the Nevada Test Site Region
(according to Steward 1938)

More broadly still, semiautonomous local district groups were linked together into regional networks and ultimately into "national" ethnic groups with national leaders. Runners carried messages between the leaders of different local units and larger subtribes, thus serving to coordinate the information and activities of the many districts comprising the larger ethnic group. Prior to Euroamerican colonization, the Southern Paiute nation was comprised of many semiautonomous districts, clusters of which were organized into two regional subtribes. The Western Shoshone national ethnic group was likewise comprised of dozens of local district groups, as was the Owens Valley Paiute national group.

Even more broadly, there were extensive patterns of trade (Steward 1938:45) and political relations between the distinct ethnic groups or nations: between Western Shoshones, Southern Paiutes, Owens Valley Paiutes, and other neighboring national groups.

These larger sociopolitical units disintegrated to a great extent under the pressures of colonization by Euroamericans and resource loss which resulted from that process. Remnant units of traditional district groups amalgamated into labor gangs who resided near Euroamerican towns and engaged in seasonal wage labor on farms, ranches and mines. These remnant labor gangs or labor camps were mistakenly interpreted in many of the early surveys of the region as being traditional bands, whereas by the time of Euroamerican settlement the impacts of introduced diseases and encroachment by livestock and prospectors had produced substantial modifications: amalgamation of remnants of traditional groups and much higher rates of intermarriage between neighboring districts--as for example between Western Shoshones and Southern Paiutes in Ash Meadows, which had earlier been a Southern Paiute district. By the time systematic surveys and ethnographic studies began to be carried out, there had been additional modifications in subsistence and social patterns resulting from encroachment of Euroamerican settlers on essential resources. Indian people had become increasingly involved in labor for Euroamerican employers, and Indian villages were evolving into labor camps with more mixed populations than formerly.

Precontact population levels can only be roughly estimated. Native American people in the southern Great Basin experienced a tremendous loss of population due to disease pathogens introduced by Euroamericans (Stoffle and Dobyns 1982, 1983; Stoffle, Dobyns and Evans 1983; Stoffle and Evans 1978; Evans 1985; Stoffle, Jones and Dobyns 1983). Much of this loss occurred well before Euroamericans began to keep written

records of events in the region. What the earliest Euroamericans took as the baseline Native American population undoubtedly was a population already much reduced by post-contact diseases.

Summary of Interactions between Euroamericans and Native Americans since Contact

Within the Nevada Test Site itself, Euroamericans never established any substantial permanent settlements until the area began to be developed for military uses in the 1940s. From their perspective, this was a desolate backcountry. Prospectors roamed through the Nevada Test Site, and a few small mines were operated there, but no major mines emerged, and no towns. The area was little-known, and is little discussed in written records. This is another reason that an understanding of the Yucca Mountain region must be constructed within a larger, regional perspective.

In the region of the Nevada Test Site there have been several distinctive phases of interaction between Native American and Euroamerican people since the early 1800s. Change in the numerical ratio between Indian and Euroamerican populations has been one important factor influencing different patterns of interaction during different periods. Euroamerican strategies of development have also changed over time, and Native American strategies of adaptation to these historic intrusions have likewise changed.

During some of the period since contact between Native Americans and Euroamericans, neither group was dominant; each group had the ability to limit the other group's access to resources; the two groups were engaged in a competition for resources (Hoetink 1975:9). During the same period each ethnic group controlled social resources that were important to the other group, thus involving the two groups in cooperative or symbiotic relations as well as competitive relations.

During other periods since contact, Euroamericans have been in a position of dominance. Consequently, they had the ability to limit Native Americans' access to resources while Native Americans had little ability to limit Euroamerican access to resources. At other times the picture has been more mixed, with Euroamericans in a position of numerical and political superiority and in control of most of the resources, but with Native Americans nonetheless successfully asserting claims to resources.

During the period when Native Americans and Euroamericans were engaged in a relatively equal competition for resources, one of the

important strategies used by Indian people was manipulation of ethnicity, a strategy used in most situations of ethnic group competition. Manipulation of ethnicity involves modification of a group's sociopolitical organization, political leadership, and cultural self-definition in order to better compete and/or coexist with another ethnic group (Stoffle and Evans 1978:17). Manipulation of ethnicity often involves the manipulation of religion, as in the adoption of another group's religion or elements of it.

The nineteenth century was a period of competition for natural resources between Native American people and Euroamerican travelers, miners, and settlers. Native Americans continued to outnumber Euroamericans; Euroamericans had not yet attained a position of dominance. Euroamericans encroached on and appropriated many springs, but Native Americans also retained control of some springs. Native Americans engaged in many acts of resistance to Euroamerican settlement, sometimes in localized incidents like the killing of livestock or the killing of a lone prospector intruding in some remote area, and sometimes in organized campaigns. Alongside of competition for natural resources during the nineteenth century, there were also close cooperative interactions between the two ethnic groups. Several of the earliest Euroamerican settlers in the region married Native American women. Euroamericans depended upon Indian people to perform much of the labor on their ranches and farms, and travelers and prospectors depended heavily upon the knowledge Native American guides possessed of the region's topography and resources. Indian people depended upon Euroamericans for industrially-produced goods and the wages to buy them.

Each ethnic group, then, controlled sociocultural resources important to the other group. Native Americans did not become completely dependent upon wage labor; they continued to derive much of their livelihood from subsistence horticulture and from the harvesting of wild food resources and were largely able to fall back on traditional subsistence resources when unemployed or underemployed. Indian people thus remained in a position to engage in acts of resistance, and in a position to compete for resources. Interaction with Euroamericans during this period was thus a mixture of competitive and cooperative or symbiotic interdependence.

The American Indian population declined during the nineteenth century, due chiefly to diseases introduced in the Columbian exchange (Crosby 1972; Stoffle, Jones and Dobyns 1983). Nonetheless, the Native

American population in this region continued to outnumber Euroamericans into the early years of the twentieth century.

Native American manipulation of ethnicity in response to the loss of population and Euroamerican intrusion involved extensive modifications in sociopolitical organization. New groupings emerged through the consolidation of the remnants of once larger groups. With smaller aggregate populations, the strength of each ethnic group or nation, and the strength of its national leaders, was reduced. As more and more Native Americans worked for Euroamerican employers, their communities increasingly took on the characteristics of labor camps. New patterns of political leadership emerged. Local Native American leaders became entrepreneurial culture brokers between their people and Euroamerican employers and functionaries. In this region manipulation of religion was not a major part of Native American ethnic manipulation. Except for the Mormon missions in the Las Vegas area in the 1850s, there was virtually no missionary activity in the region and little organized pressure upon Native Americans to modify their religious beliefs and practices.

After the turn of the century, with a mining boom underway in southern Nye county and a concomitant explosion of their population, Euroamericans became numerically, culturally, and politically dominant in the oasis areas. Native Americans suddenly became a minority within the core oasis areas where most continued to make their primary residence. Indian people were no longer in a position to mount resistance to encroachment and effectively compete for prime resources in the oases, although they still retained a few of the smaller springs and thus control over more remote "refuge areas" (Aguirre Beltran 1973) where they continued to harvest wild food resources.

Native Americans adopted a three-pronged "adaptive strategy" (Bennett 1969, 1976) in an effort to hold their population and culture intact within an environment that had been ecologically, economically, and socially altered by Euroamerican intrusion and in which the latter were now dominant in the major oasis areas. In the core oasis areas--including Oasis Valley and Ash Meadows--a majority of Native Americans now lived in labor camps located on Euroamerican-owned farms and ranches or in labor camps on the outskirts of mining towns. Here they constituted a pool of labor available for temporary and intermittent employment by Euroamericans.

The same Native American people who worked for Euroamerican employers also practiced a complementary strategy in more remote areas.

Much of the Nevada Test Site constituted a "refuge region" (Aguirre Beltran 1973) where Euroamerican encroachment was generally limited to the short-term presence of prospectors. The Nevada Test Site area contains only scattered water resources; most of the springs are quite small. Few Euroamerican ranches were ever established in the area. Prospectors combed the region but only a limited number of mines were ever developed within the Nevada Test Site, none of them major producers. Throughout most of this area, Native Americans were able to continue their traditional patterns of seasonal harvesting of wild food resources. Some families made their primary residence within this refuge area, relying heavily upon traditional subsistence strategies. Others continued to enter the Nevada Test Site area intermittently to harvest wild food resources, though their primary residence was at a ranch or at one of the mining towns in the Oasis Valley area. These wild food resources provided a backup source of subsistence to supplement the wages of underemployed and unemployed Native American workers in the labor camps. Wild food resources collected in the Nevada Test Site and other refuge areas also constituted a commercial product that Native American people sold to Euroamericans in the towns. Most Native American families, then, derived their livelihood from a two-fold strategy involving both labor in the Euroamerican sector, based in a labor camp, and wild food harvesting in a refuge area.

A third strategy was practiced by some Native American families, who continued to cultivate at a limited number of springs. Produce grown on Native American-operated farms in Ash Meadows, and apparently in Oasis Valley as well, was marketed in the mining boom towns in Oasis Valley.

With the fading of the mining boom and the swift decline in population which ensued as a result of outmigration, Euroamericans were no longer so completely dominant in the region. Native Americans were still a minority, but after the mining boom tapered off their access to natural resources expanded somewhat, as did their ability to compete for social resources. Only during the twentieth century did Native Americans in southern Nevada begin to receive reservation lands. Some Native American people continued to live within the area of the Nevada Test Site, and many continued to harvest wild resources there, up until the area was withdrawn from public use in the 1940s.

Beginning in the 1940s, the area of the Nevada Test Site began to be withdrawn from public use, with the creation of the Tonopah Bombing

and Gunnery Range, the Nellis Air Force Range, and the Nevada Test Site. The withdrawals of land decisively reduced Native American access to wild plant and animal resources and contributed to a diaspora of Indian people from the region of the Nevada Test Site that had already begun with the establishment of reservations - all of which were at considerable distances from the later Nevada Test Site.

In the 1960s, 70s, and 80s Native Americans in Nevada - including Native Americans with historic ties to the Nevada Test Site - have become more politically assertive on resource issues in the region. In the early twentieth century, Euroamericans widely perceived Native Americans in the region as a "vanishing race" (*Beatty Bullfrog Miner* vol. 1, no. 27, Sept. 23, 1905, p. 1, col. 1; *Bullfrog Miner* vol. 4, no. 5, April 25, 1908, p. 8, col. 3). But Native Americans have adapted and persisted. After long periods during which their resource base declined and their political organization became progressively weakened, the resource base and political strength of Native American people has grown during recent years.

Competition in the Early Contact Period: 1776 to the mid-1800s

From earliest contact on, Native Americans were subject to wave after wave of epidemic disease to which they had no prior immunity. The earliest such epidemics may have reached Southern Paiutes in the early decades of the 1500s, when pandemics of measles and smallpox spread north from central Mexico along trade routes into the Southwest (Crosby 1972; Stoffle, Dobyns and Evans 1983:41, 43). In the 18th century, Euroamericans began to enter the region, and the new diseases made an even greater impact. Each wave of epidemic brought additional fatalities, resulting in a major decline in population over time. Even though their population declined dramatically, Native Americans continued to outnumber Euroamericans in the region of the Nevada Test Site and thus remained in a position to compete for resources on a relatively equal footing.

The first Euroamericans known to have entered the region were the Spanish priests Garces, Dominguez, and Escalante on their 1776 expedition. Angloamerican trappers entered the region at least as early as the 1820s. Many of these early travelers noted in their accounts that Southern Paiutes in what is now southeastern Nevada practiced irrigated horticulture along the Virgin, Santa Clara, and Muddy Rivers (Smith,

1977:57-59,64; Hafen and Hafen 1954:I:115). Jedediah Smith recorded that along the Santa Clara River Native American people offered ears of corn as "an emblem of peace" (Smith 1977:57).

By the 1830s there was regular Euroamerican traffic across the southern Great Basin along what came to be known as the Old Spanish Trail - actually a wide swath of territory. Large herds of livestock were driven across southern Nevada, grazing along the way and destroying crucial resources used by Native Americans in the region: the springs and the seedgrains that comprised a major part of the Native American diet.

Slave raiding also had a heavy impact upon Native Americans in the vicinity of the Old Spanish Trail. Many southern Nevada Paiute women and children were seized as slaves during this period (Hafen and Hafen 1954:I:278; Hafen and Hafen 1954:II:261-262; Jensen 1926:196). Both Euroamericans and Native Americans belonging to neighboring ethnic groups were involved in these raids upon Southern Paiute communities in southern Nevada.

For most of the nineteenth century the predominant impact of Euroamericans upon resources in the region was in the form of livestock grazing. During this period a great deal of Native American resistance to Euroamerican encroachment was focused on the livestock herds. Native Americans most commonly shot or shot at Euroamerican livestock rather than at the Euroamerican herders or settlers. When their livestock were killed or missing, Euroamericans often retaliated by killing Native American people they believed responsible. Euroamericans perceived the killing of livestock by Native Americans as poaching for food by improvident, starving Indians who had no regard for property rights. American Indian people perceived the grazing of livestock herds on their territories as appropriation and destruction of resources essential for survival by people who had no regard for established rights to water and plant resources.

Native Americans in the Great Basin had developed a highly effective adaptation to their desert environment, but it was an adaptation that Euroamericans found unfamiliar and repugnant. The transhumant adaptive strategy was able to support a substantial population in an arid environment. However, it resulted in social and technological characteristics that Euroamericans regarded with disdain and disgust. During much of the year people lived in lightweight, temporary shelters, adapted to the need to move from place to place in order to harvest resources at the proper time. Minimal clothing was worn in hot weather.

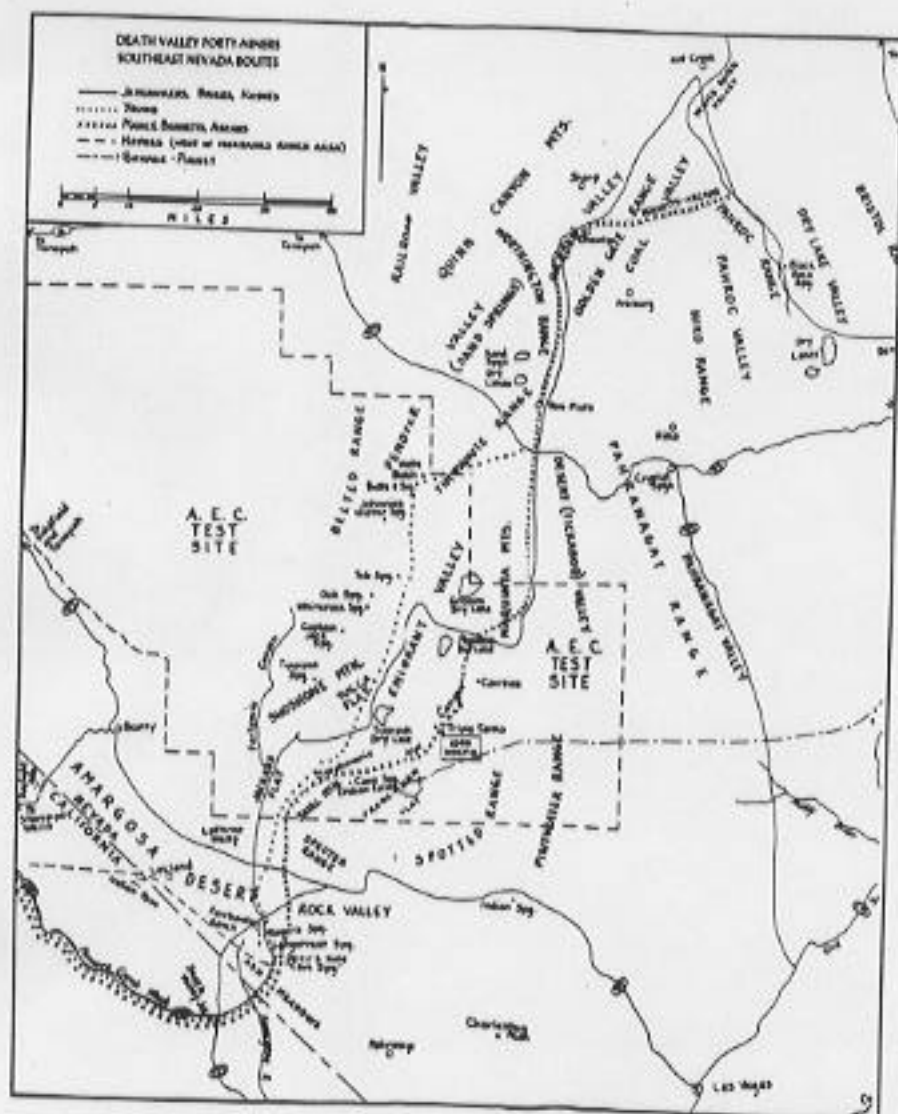
Use of pottery was limited: instead, extensive use was made of basketry containers that were much better suited to a lifestyle involving extensive travel. People harvested a great range of species for food, including many regarded as unfit for human consumption within the perspective of Euroamerican customs. The need to respond to fluctuations in food supply resulted in selection for a flexible and egalitarian social structure in which families could function equally well in isolated kin-based family groups when food was scarce or in large band clusterings when food was plentiful. Access to resources could be partially restricted by usufruct, but patterns of ownership differed substantially from those familiar to Euroamericans (Stoffle and Evans 1978:7).

Given the great cultural differences between economic patterns, nineteenth century Euroamericans widely regarded Native Americans in the Great Basin as culturally inferior. Many Euroamericans regarded Indian people as less than fully human. Such prejudices kept them from perceiving how well Great Basin cultural adaptations were matched to the desert environment and how fully Native Americans actually used the available resources. Euroamericans also failed to comprehend that the Native American population had suffered a drastic decline due to introduced diseases, contributing to the view that the adaptive strategy practiced by Indian people in the region was capable of supporting only limited levels of population. Prejudice and lack of familiarity with Great Basin cultural adaptations fostered Euroamerican contempt for the indigenous cultures and a belief that the land was not being effectively utilized by its Native American inhabitant (Stoffle and Evans 1978:20). This erroneous and self-serving belief was used to rationalize the appropriation of resources and the killing of Indian people who stood in the way of Euroamerican appropriation of resources. The number of Native Americans killed in interethnic violence in the region was far greater than the number of Euroamericans killed in such encounters.

The fatal diseases which so often accompanied contact with Euroamericans, the loss of women and children in slave raids, and the hostility and violence which so many Euroamericans directed at Native American people caused them to avoid Euroamericans as much as possible during the early years of contact. Early travellers often saw Native Americans vanishing in the distance and often encountered villages and camps that seemed to have been hastily abandoned (Knack and Stewart 1984:35).

The first Euroamericans to cross the heart of the Nevada Test Site and provide detailed accounts of the area were the parties of 1849er emigrants now commonly referred to as the "Jayhawkers" (see Map 5). Interactions between these emigrants and the local Native Americans well illustrate the often violent way Euroamericans treated Native Americans; the working assumption held by Euroamericans that they had a right to appropriate whatever resources they needed without regard for Native Americans' rights and possession; and the tendency of Native American people to withdraw from contact with Euroamericans during this period. In the Tempiute area, the emigrants found two Native American men engaged in cleaning out a spring. The two men were taken captive, to serve as guides. One of these men escaped, and later in the day a third was taken captive (Nusbaumer 1967:36; Long 1941:173). The accounts of Lewis Manly and John Rogers report that the emigrants saw numerous indications of Native American occupancy in this arid region, including camps, food caches, and water sources to which beneficial improvements had been made (rock covers over water basins, a clay bowl constructed under a seep on a canyon wall) (Manly 1927:134-135, 137, 139, 140, 148, 160). At several times the 49er emigrants observed Native American people, most of them in the act of fleeing, attempting to hide, or watching the emigrants from a safe distance (Manly 1927:137, 139, 163; Johnson and Johnson 1987:150-151). The 49er emigrants found Native American food caches at many locations within the region of the Nevada Test Site, and did not hesitate to consume the food (Manly 1927:148, Johnson and Johnson 1987:59).

At Cane Spring scouts of one of the emigrant parties happened upon a Native American rancheria with corn stubble still standing in the fields. One of the Southern Paiute residents offered the emigrants corn in a gesture of goodwill and then fled after the scouts departed to guide the rest of their party to the rancheria (Manly 1927:151, 153, 157). The emigrants stayed at the Cane Spring rancheria for ten days, grazing a sizeable number of livestock and consuming a cache of squash they were able to locate (Belden 1954:64; Johnson and Johnson 1987:59). Two days after the emigrants had moved on from Cane Spring, Native Americans shot several of the livestock that had been grazed at the rancheria (Belden 1954:64; Johnson and Johnson 1987:61). John Rogers later reflected that "I suppose the Indians shot our cattle out of revenge for eating their squashes" (Belden 1954:64).



Map 5. Routes of the Forty-Niners (Koenig, 1984).

Competition and Cooperation: mid-1800s to 1904

During the late 1800s and the first few years of the twentieth century, Native Americans in the region of the Nevada Test Site remained in a position to compete with Euroamericans for resources. Native American response to Euroamerican intrusion and settlement was mixed, involving both resistance and hostilities on the one hand, and economic interaction and intermarriage on the other.

Native American Response to Mormon Colonization in the 1850s

Mormons extended their colonizing efforts into southern Nevada in 1855. They founded missions at Las Vegas and on the Muddy River and they prospected and mined in the surrounding region. The earliest sustained relations between Native Americans and Euroamericans in the region of the Nevada Test Site centered on these Mormon missions and mining efforts. Native Americans worked for the Mormons, cultivating fields which they had previously owned themselves, and transporting ore in exchange for food and cast-off clothing as payment for their labor (Jensen 1926:275-276,281). Interactions with the Mormons, including Mormon preaching and baptism, provided the earliest ongoing first-hand exposure of Native Americans in the region to Euroamerican ideas and customs.

The Mormon missions were shortlived, however. Mormons abandoned their mining efforts in the region around Las Vegas in 1858 and closed the missions in the following year. Mormon chronicles explain the short life of the missions by stating that the Native Americans constantly stole from the Mormons and that demands and threats made by chiefs kept the Mormon settlement in constant fear of attack (Jensen 1926:275-276,281; Hafner 1967:10-12; Squires and Squires 1955:163-168). During this early period of initial colonization, Native Americans outnumbered the Mormon settlers and were largely able to successfully compete with the settlers for control of resources in this region. Soon after colonization, however, Native American population declined due to a number of epidemic diseases introduced by Mormon emigrants (Stoffle, Jones and Dobyns 1983).

Native American Interaction with Euroamericans: 1860s and 1870s

By the late 1850s and 1860s Euroamerican prospectors were active throughout the southern Great Basin. They were frequently the targets of Native American resistance. In 1861 a party of Mexican Americans developing a gold mine in the Amargosa Valley were killed by Native Americans (Spears 1892:22).

Mines were developed in the Owens Valley area beginning in 1860, and many California stockmen drove their herds into the Owens Valley during the early 1860s after drought conditions reduced the available grazing further west (Busby et. al. 1979:49,54). This influx of miners, livestock herds, and ranchers set in motion years of hostilities between Native Americans and Euroamericans in the Owens Valley region, hostilities which escalated into larger and larger armed conflicts. Fort Independence was founded in 1862 to establish military control over Native Americans in Owens Valley. After soldiers launched an extensive campaign of destruction of Native American crops and food caches in 1863, some one thousand Native Americans surrendered and were exiled to Fort Tejon (Chalfant 1922:146-147; Busby et. al. 1979:56; Chalfant 1933:194-195); this represented about one-third of the total Native American population of Owens Valley (Chalfant 1933:195). Hostilities continued in Owens Valley until 1865 when some one hundred Native American people were killed and their resistance came to an end (Greene 1981:26). Native Americans from Death Valley, the Panamint Range, and Ash Meadows participated in the Owens Valley hostilities with ranchers and miners (Lingenfelter 1986:19). Thus, the "Indian wars" in the Owens Valley region apparently involved some of the people in the region of the Nevada Test Site, and some of the localized hostilities in southern Nevada during this period can be seen in a broad relationship to the more extensive hostilities in Owens Valley.

Mining and mine towns were also developing in the area around Pioche--to the east of the Nevada Test Site--by the late 1860s, and many Euroamerican farms and ranches were established in that area. There were numerous armed confrontations between Native Americans and Euroamericans in the vicinity of Pioche as the two ethnic groups competed for the resources in that area (*Pioche Daily Record* vol. 6, no. 13, April 1, 1873, p. 3, col. 3; *Pioche Daily Record* vol. 9, no. 77, December 17, 1874, p. 3, col. 1; *Pioche Weekly Record* vol. 19, no. 10, November 22, 1879, p. 3, col. 1).

In the oasis areas west and south of the Nevada Test Site, and within the Nevada Test Site itself, Native Americans continued to greatly outnumber Euroamericans, although the absolute level of Native American population was in decline due to high mortality from introduced epidemic diseases (Stoffle, Jones and Dobyns 1983). The expeditions led by George M. Wheeler in 1869 and 1871 employed many Indians from the Spring Mountain area as guides and messengers; from his contacts with these people Lieutenant Wheeler estimated that there were several hundred Native Americans in the area around the Spring Mountains (Wheeler 1875:21). At that time there were as yet no Euroamerican settlers in Ash Meadows or Oasis Valley. The Wheeler expedition reported that interactions between Native Americans and Euroamericans presented a mixed picture. Often interactions were peaceful, but in isolated locations lone prospectors or small parties of prospectors were likely to be attacked and killed by Native Americans (Wheeler 1872:28).

Native American Resistance

Much of Native American resistance to Euroamerican intrusion continued to focus on livestock during the period when the first scattered Euroamerican ranches were established. Euroamerican livestock herds competed with Native American people for resources crucial to their subsistence - springs, irrigated croplands around springs, and wild seedgrains important in the Native American diet. When the Yount family grazed a herd of cattle and horses near "Horseshutem Springs" in the hills between Ash Meadows and Pahrump Valley in 1876, Native Americans reportedly selectively killed all of the horses that had collar marks (all of the work horses) in an effort to prevent the establishment of a ranch there; "an Indian chief known as 'Hos Killum' was regarded as the party responsible for the killing of the animals (Brooks 1970:10-11,39; Doherty 1974:166-167). In 1882, Native Americans near Pioche repeatedly drove away livestock that were damaging their crops. Reportedly the Euroamerican owner of the livestock killed a Native American man in indignation over having his livestock driven off (*Pioche Weekly Record* vol. 24, no. 19, July 22, 1882, p. 3, col. 3) .

Native American resistance to Euroamerican intrusion was also frequently expressed in threats or assaults aimed at prospectors. One of the most famous of such incidents involved Jacob Breyfogle, who in the early 1860s was trailed by a party of Native Americans in the Amargosa

region, assaulted by one of them, and left for dead. After surviving this ordeal, Breyfogle's memory was impaired and he was unable to relocate the spot where he had found rich ore, though he made many attempts. The legend of the "lost Breyfogle mine" spurred countless other prospectors to comb the region in hopes of finding it. Ash Meadows Charley reportedly stated that he had been in the party of Native Americans that trailed Breyfogle and left him for dead (Coolidge 1937:63-66). Around 1880 a prospector was reportedly attacked and driven out of Fortymile Canyon by a group of Indians (*Carrara Obelisk* vol. 2, no. 1, May 8, 1914, p. 6, col. 3). Prospectors continued to be occasional targets of Native American resistance through the early twentieth century. Around the turn of the century several prospectors were apparently murdered in the Ash Meadows area, reportedly by Bob Black, a Native American resident of the area (*Goldfield Review* vol. 1, no. 38, July 13, 1905, p. 6, col. 2). In 1904 two prospectors were reportedly killed by Native Americans in the vicinity of Caliente (*Searchlight* vol. 2, no. 31, January 8, 1904, p. 1, col. 4).

Native American people worked as prospectors on their own behalf to a much greater extent than is generally recognized in histories of the region. Native American individuals also entered into working partnerships with Euroamerican prospectors. They helped a number of Euroamericans locate valuable ores but almost never received any significant share of the profits. Native Americans who prospected in their own right were in competition with Euroamerican prospectors. Killings of Euroamerican prospectors by Native Americans can be seen, then, within the context of competition over mineral resources.

Many nineteenth century Euroamericans believed that the majority of Native Americans in the region were inclined to peaceful and cooperative relations. Incidents of Native American resistance and hostility were often attributed to "renegade bands" (*Searchlight* vol. 2, no. 31, January 8, 1904, p. 1, col. 4). While this may have considerable explanatory value, it is also likely that many of the same groups and the same individuals engaged in both peaceful relations and in hostile acts of resistance on different occasions.

Economic Interaction and Intermarriage

In addition to initial resistance to Euroamerican settlement and continuing competition for control of resources, Native Americans in the

region increasingly entered into economic relations, as well as marriage relations, with Euroamerican settlers. By the 1880s there were a handful of Euroamerican ranches and farms in Oasis Valley, Ash Meadows, and Pahrump Valley. Native Americans typically performed the bulk of the labor on these farms and ranches, living in labor camps located on or near each ranch (*Goldfield News and Beatty Bulletin* vol. 47, no. 1, June 24, 1949, p. 1, col. 4). Labor camps on farms and ranches often were located on the site of a traditional village and tended to reflect the ethnic composition of that traditional village, though the community was now in a subordinate relationship to a Euroamerican proprietor who had appropriated all or most of the springs.

Often Euroamericans had taken over the use of springs and land by paying Native American people for temporary use of resources and then claiming their payment had constituted an outright purchase of the resource. In other cases they claimed a spring where there was no Native American habitation to be seen in the immediate vicinity and then enforced their claim with firearms when the Indian owners of the area asserted their prior claims. Euroamericans fenced in resources and guarded the land they appropriated with guns (Knack 1987:61). As Euroamericans appropriated oasis resources, Native American people were unable to continue cultivating at many of the springs. Increasing numbers of livestock reduced the availability of the wild grains that had formed an important part of the traditional Native American diet. American Indian people were consequently drawn into wage labor for flour, pork, and beef, in order to compensate for the reduced access to traditional sources of subsistence (Knack 1987:61-62).

By the 1880s Native Americans in the region were increasingly involved in the Euroamerican economic sector as laborers and as consumers. Ranch records from the Stewart Ranch at Las Vegas for the 1890s provide information about patterns of economic exchange between ranch owners and Indian employees that probably are representative of ranches throughout the region of the Nevada Test Site. On the Stewart ranch Southern Paiute men performed the full range of tasks on a diversified farming/ranching operation, while Southern Paiute women were employed only for laundering (Knack 1987:44-45). Much of the payment for work was in the form of credit; on the Stewart ranch the ranch-owner maintained a limited stock of goods available on credit against her employees labor' (Knack 1987). The wages of Indian laborers on the Stewart ranch were used to obtain foodstuffs, including flour, pork,

beef, and coffee; men's ready-made clothing; bolts of cloth for women's clothing; and tobacco (Knack 1987:47).

In addition to performing farm and ranch labor, Native American men served as guides for Euroamerican prospectors and travellers. Euroamerican travellers and prospectors depended heavily upon Indian guides for their knowledge of topography and resources crucial to survival and to locating potentially valuable minerals. Native Americans were involved in the discovery of many of the mines in the region.

During the same period, Native American women entered into common law marriage relations with several of the early Euroamerican settlers in the region (Ransome 1907:41). Of these intermarriages, the best known are those involving Montillus Murray Beatty and Jack Longstreet. The town of Beatty is named for Montillus Murray Beatty, one of the first Euroamericans to settle in the Oasis Valley. M. M. Beatty married an Oasis Valley Native American woman and the couple raised several "mixed-blood" children (Earl 1986:10-13; *Tonopah Miner* vol 4, no. 5, July 15, 1905, p. 6, col. 4; *Rhyolite Herald* vol. 4, no. 34, December 16, 1908, inside p., col. 3; M. M. Beatty, Jr 1968). (see Photo 5). Jack Longstreet, another early Euroamerican settler in the region, married an Ash Meadows Paiute woman and often served as a mediating figure on behalf of Native Americans in their dealings with Euroamericans (Zanjani 1988:109-111; Zanjani 1987:45).

By marrying local Native American women, Euroamerican men linked themselves to the indigenous population, gaining access to a wealth of Native American local knowledge about topography and resources. These intermarriages created an important basis for coexistence between Euroamerican and Native American ethnic groups during the early phase of settlement, although the mixed-blood children of these unions occupied a difficult cultural position, not entirely accepted by either Native American or Euroamerican society (Knack 1986:91).

In the late 1800s freight and mail stage lines were routed through the Fortymile Canyon area. There were relay stations for brief periods at White Rock Spring, at Tipipah Spring, in Fortymile Canyon, and in Ash Meadows (*Nevada Test Site News* vol. 12, no. 6, August 8, 1969:7; Pippin and Zerga 1983:57; Koenig 1984:72) and at Cane Spring (Worman 1969:12). These encroachments upon key water sources in this area probably forced Indian people to discontinue their use of these springs for a time. After the stage lines were discontinued, Indian people may well have reestablished patterns of use of these springs.



Photo 5. The M. M. Beatty Family at the Beatty Ranch.

Photo shows Montillus Murray Beatty, his daughter Maude Beatty, and his sons Frank Finlaw Beatty and Montillus Murray Beatty, Jr. in front of buildings at Beatty's ranch, just north of the town of Beatty. (The walls of the stone building are still standing.) M. M. Beatty was one of the first Euroamerican settlers in the Oasis Valley area. He married a local Native American woman (not shown in photo). The children's Native American ancestry on their mother's side is visible in this photo. Accession information dates the photo as circa 1905. Nevada Historical Society, Nye County Photograph #527.

Euroamericans were not in a completely dominant position during this period. They were heavily dependent upon Native American skills and knowledge. Although Native Americans performed a variety of jobs for Euroamerican employers, they were not completely dependent upon wage labor for survival. Indian people still retained control of an important share of natural resources in remoter areas. They continued to inhabit many of their traditional village sites (though now often reconstituted as labor camps within a Euroamerican-controlled farm or ranch), continued to farm at some of the springs in the major oases, and continued to have effective control over extensive areas remote from the major oases. In these remote areas, Native Americans continued to harvest wild food resources, which continued to provide an important part of their diet as well as providing products for sale in the towns. Montillus M. Beatty's son, M. M. Beatty, Jr., recalled that near the turn of the century there were still several different groups of Native Americans (he used the term bands) that continued to rely heavily on the traditional transhumant strategy and periodically stayed near the Beatty Ranch during a portion of their annual cycle of transhumance (M. M. Beatty, Jr. 1968). Some Native American families still derived part of their diet from cultivating at small springs they continued to control.

Labor relations and ethnic relations at the mines in this region are poorly documented, but there is some documentation of conflict between Native American mine laborers and Euroamerican managers. At the Sylvania mine west of Oasis Valley near the Nevada/California border, the superintendent had long paid Native Americans with scrip rather than cash. No one but agents of the mine would cash the scrip, and they pocketed a large share. Indian mineworkers had long complained about this unfair method of payment. In 1890, a Ghost Dance was held a few miles west of the Sylvania mine. When the festivities there had wound down, a crowd set out to seek liquor from a prospector at a nearby cabin. Frightened by the crowd, he shot at them, and the party travelled on toward the Sylvania mine. Jack Longstreet and another man - both of whom had Native American wives - reportedly took the lead in persuading the crowd to take direct action to force the mine superintendent to pay them in freely negotiable money. The superintendent was beaten up and under duress wrote checks to the Native American mineworkers in addition to supplying them with a quantity of liquor (*San Francisco Examiner* vol. LII, January 11, 1891, p. 4, col. 1).

Angry posses of Euroamericans were quick to form when one of their people was killed by a Native American individual. Interestingly sheriffs were sometimes accompanied by posses of Native Americans when one of the latter was the victim of Euroamerican violence. When an entire Native American family was murdered in the Amargosa Valley in 1881 by two Euroamerican men, several Native Americans, including Shakespeare Black Montezuma Dick, and Butcher Jake were in the posse that tracked the killers and killed them near a sacred medicine rock in the Amargosa Valley (Cook, n.d.:18).

Demographic Change

Demographic data is sparse, but there is clear evidence that the region was repeatedly swept by epidemics that had a severe impact on Native American population in terms of high mortality (Stoffle, Jones and Dobyns 1983). Euroamerican colonists were debilitated as well by the same diseases. Native Americans were exposed to diseases carried by Euroamericans long before Euroamericans began to settle in the region, but only after Euroamericans had settled in the region did there begin to be written information on such occurrences. Newspapers have been published in Pioche, east of the Nevada Test Site, since the 1870s. While coverage of Native American events was limited, there is enough data to conclude that the Native American population continued to decline, and that epidemic diseases were major contributors to this decline (Stoffle, Jones and Dobyns 1983). In 1873 large numbers of Native American people were reported to be "dying in the sagebrush" in the vicinity of Pioche, apparently of an epidemic disease (*Pioche Record* vol. 6, no. 24, April 19, 1873, p. 3, col. 1).

Manipulation of Ethnicity

During this period Native Americans made significant modifications in their ethnicity and sociopolitical organization, in order to adjust to Euroamerican intrusion and the impacts of introduced epidemics. As Native American population levels continued to decline, as Euroamericans appropriated resources, as intermarriage between Southern Paiutes and Western Shoshones increased, and as Native Americans became increasingly involved in labor for Euroamericans, the nature of their social units and regional political systems were gradually transformed.

Native Americans in the region were traditionally organized into localized district groups--cohesive, semiautonomous local ethnic subunits. These districts were grouped into regional units--subtribes--which were in turn grouped together into "national-level" ethnic polities. Thus, the traditional Southern Paiute nation was composed of two subtribal divisions, each comprising a number of districts; the Pahrump Valley/Ash Meadows district was located within the western subtribe of the Southern Paiute nation (Stoffle and Dobyns 1982, 1983). The Western Shoshone nation was similarly composed of subtribes, and the subtribes were in turn composed of districts.

In this region, where Western Shoshone and Southern Paiute territories met, there were apparently occasional intermarriages between Southern Paiutes and Western Shoshones prior to contact. Intermarriages and villages of mixed Southern Paiute and Western Shoshone population became more typical in the post contact period. Decimated by disease, robbed of land and resources, and increasingly dependent on the Euroamerican cash economy, many Indian communities were reconstituted as ethnic amalgamations of former aboriginal units. Several Southern Paiute villages might consolidate into a single village in response to population loss and loss of resources to Euroamerican appropriation. Or what had been a Southern Paiute village might now become an ethnically mixed labor camp. Labor camps in Oasis Valley and Ash Meadows included both Paiute and Shoshone residents. Such intermarriages and mixed villages allied the two ethnic groups more closely and created a stronger basis for competing with Euroamerican settlers and maintaining Native American population and culture.

New patterns of Native American leadership emerged in response to demographic change and loss of resources. Native American leaders at the local level emerged into greater prominence, while national level political leadership was undercut. Declining population, Euroamerican encroachment on resources, and the emergence of more independent and more entrepreneurial local leaders all contributed a weakening of national and regional level political organization, a weakening that was noted by early observers (Secretary of the Interior 1874:4). A Native American leader at the local or district level became less the elder of a local group of people related by kinship and ethnic identity and more an entrepreneurial culture-broker who managed and negotiated economic relations between Euroamerican employers and a fluid population of Native Americans living in a labor camp that often included individuals

from more than one ethnic unit.

The late 1800s were a transitional period, during which Native American communities in the region of the Nevada Test Site combined characteristics of the traditional local unit and of the nontraditional labor camp. Powell and Ingalls (Powell and Ingalls 1874) and other Euroamericans during that period assumed that the Native American groups they observed in the region were traditional bands, but it is clear that by this time there had already been a considerable modification away from traditional sociopolitical organization.

Many of the traditional regional and national political patterns persisted on a reduced scale, nonetheless. Systems of communication via Indian runners were still functioning in southern Nevada in the late 1800s. In 1883 Indian runners from the Bullionville area carried a message to the Muddy River, asking the chief there to come to their assistance when Euroamericans in Bullionville mobilized to attack the local Native American community in retaliation for a non-fatal shooting of a Euroamerican by a Native American man (*Pioche Weekly Record*, vol. 26, no. 5, April. 14, 1883, p. 2, col. 2). In 1895 "Cowich Bill, Chief of the Piutes" (of Delamar) and "Duck Creek Charley, Shoshone Chief (of Pioche) held a number of telephone conferences to reach a resolution of the murder of a Paiute man by a Shoshone man in a Native American labor camp on the outskirts of Pioche (*Pioche Weekly Record* vol 45, no. 12, Dec. 12, 1895, p. 4, col. 3).

In the late 1800s there was extensive involvement of southern Nevada Southern Paiute people in the Ghost Dance (Kelly and Fowler 1986:384). In 1889-91 numerous Ghost Dances were held in the vicinity of Pioche--then the nearest town to the Nevada Test Site. A Ghost Dance is also reported for the winter of 1890-91 in the Sylvania Mountains northwest of Oasis Valley on the California-Nevada border (Zanjani 1987:47-48; Zanjani 1988:55-56; *San Francisco Examiner* vol. LII, January 11, 1891, p. 4, col. 1). These dances brought Indian people together from great distances. In part, the Ghost Dances represented a continuation of traditional regional gatherings, but during the height of the Ghost Dance movement these gatherings occurred much more frequently, every month or two in the Pioche region, for example (*Pioche Weekly Record* vol. 37, no. 6, April 20, 1889, p. 3, col. 1, col. 3; *Pioche Weekly Record* vol. 37, no. 11, May 25, 1889, p. 3, col. 2; *Pioche Weekly Record* vol. 37, no. 16, June 29, 1889, p. 3, col. 3; *Pioche Weekly Record* vol. 38, no. 1, September 21, 1889, p. 3, col. 3; *Pioche Weekly Record* vol. 38, no. 14, December 21, p.

4, col. 3; *Pioche Weekly Record* vol. 40, no. 17, January 10, 1891, p. 3, col. 3).

Native American Cultural Persistence

Until the early 1900s, Native American people in the region of the Nevada Test site remained in a position to compete with Euroamericans. They continued to derive much of their livelihood from the traditional transhumant adaptive strategy, retained effective control over much of the region, and retained much of their traditional culture, while at the same time adding Euroamerican cultural elements. Several factors contributed to Native Americans' continuing ability to compete and their continuing reliance on traditional wild food harvesting for part of their livelihood.

The Euroamerican population remained sparse and significantly outnumbered by Native American people until past the turn of the century. Native Americans' intimate knowledge of local terrain and resources was crucial to Euroamericans engaged in prospecting and ranching in this harsh region, meaning that many Indian people were employed in jobs that were extensions of their traditional activities - jobs that drew upon and sustained their intimate knowledge of the region's natural resources.

Most of the work performed by Native Americans in the employ of Euroamericans in Oasis Valley and Ash Meadows was seasonal, temporary, or intermittent, leaving them free to continue their traditional pattern of seasonal harvesting of wild food resources and their seasonal pattern of social events. Native Americans retained the use of some springs and continued to practice traditional horticulture. They continued to maintain effective control over much of the territory outside the major oasis areas, and continued to derive a substantial part of their subsistence from the harvesting of traditional wild food resources.

There was virtually no presence of Indian Agents or missionaries in the region after the shortlived Mormon mission at Las Vegas (1855-1858). Formal recognition of Native American groups and establishment of reservations occurred relatively late in this region. Most reservations in the area have been established since World War I, many in the 1930s and 40s. Without Indian Agents and without missionaries there were no systematic institutional pressures upon Native American people to abandon their traditions and discontinue their reliance upon traditional harvesting of wild foods, as there were among peoples under the supervision of

missionaries or reservation agents. Native American people and their local leaders were able to work out their own strategies of adaptation in an ad hoc manner, retaining much of their traditional culture, including traditional subsistence activities.

Euroamerican Dominance: the Early 1900s

Interactions between Euroamericans and Native Americans changed dramatically in the early twentieth century when a mining boom got underway in the region of the Nevada Test Site. Tonopah and Goldfield became the hub of a mining boom in northern Nye County. Rhyolite, Beatty, and Bullfrog, in the Oasis Valley area, emerged as a hub of a mining boom in southern Nye County -- a boom involving chiefly gold, but also silver, lead, and other minerals.

It was only with the advent of the mining boom that Euroamericans came into a position of clear dominance in the region of the Nevada Test Site. Discovery of profitable lodes in the Oasis Valley area, west of the Nevada Test Site, in the area of the Spring Mountains to the south, and a few less productive discoveries in the Nevada Test Site area itself, brought a massive influx of Euroamericans. Numerous mining towns and mining camps were built, and the number of ranches multiplied (see Map 6). Euroamericans swiftly came to outnumber the Native American population and became dominant. After 1904 there were several mining towns and camps in the Oasis Valley area, where a few years before there had been a handful of Euroamerican ranches and a string of Native American villages comprising the population center of the *Ogwe'pi* district. The largest of these new Euroamerican towns was Rhyolite, which attained a peak population of between 5,000 and 10,000 later in the decade (Weight and Weight 1953, 1985). Construction of a railroad through the Amargosa Valley and Oasis Valley followed in 1906. Euroamerican impacts upon water, plant, and animal resources were greatly intensified. In Oasis Valley, the flow of most of the major springs was tapped into pipelines to supply the mining towns and the ore processing mills. As a consequence, the ability of Indian people to compete for oasis resources was greatly reduced during this period. Within the oases, Native Americans became a marginalized minority.



Map 6. Towns, Mining Camps, and Railroads in the Amargosa Region
(from R. Lingenfelter 1986)

Labor Camps, Refuge Regions, and Independent Farming: Complementary Strategies

The mining boom meant an enormous intensification of the impacts of Euroamerican settlement upon natural resources in and around the major oases. The towns and camps consumed tremendous amounts of timber for firewood. Draft animals used in the construction of mines and railroads and in the transport of ore consumed seedgrains and other plants, in direct competition with Native American people for whom these had been dietary staples. Enormous quantities of water were required to operate the numerous ore-processing mills in Oasis Valley, to supply the mining camps and towns, and to support a rapid expansion of farms and ranches to supply the towns. The mining boom accelerated the process of Euroamerican appropriation of springs in Oasis Valley and Ash Meadows. Companies supplying water to the towns and ore mills bought springs from settlers who had appropriated them from Native Americans only a decade or two earlier, often without having established any formal legal ownership (*Rhyolite Daily Bulletin* vol. 1, no. 228, p.1, col. 1). Native Americans lost control of much of the resource base in the oasis areas. They continued to live on or near many of their traditional village sites in the Oasis Valley, Ash Meadows, and Pahrump Valley, but most settlements now took the form of labor camps located on Euroamerican-owned ranches or on the outskirts of the mining towns.

As Euroamericans came to dominate the oasis areas, Native Americans became increasingly enmeshed in the Euroamerican economic sector as a rural labor force. As a result of Euroamerican encroachment, traditional wild food resources were less and less available, or available only at greater and greater distances. Indian people turned increasingly to wage labor and to purchased foodstuffs to compensate for the attrition of traditional resources. Most Indian families resided for most of the year in labor camps on the outskirts of mining towns, as at Bullfrog, Rhyolite, and Beatty (see Photos 6 and 7) or labor camps on the larger Euroamerican ranches. Indian people performed a variety of jobs, discussed in a later section. Each Native American labor camp, or series of nearby camps, typically had a local leader who served as a cultural broker and negotiator for the residents of that community. Native American people also participated in social events in the towns including public celebrations, picnics, and sporting events on public holidays (see Photos 8 and 9).



Photo 6. Native American Camp, Bullfrog, Nevada.

Photo shows several Native American people inside a brush windbreak with a cooking fire. Inscription on photo reads "Mum's favorite Indian photo." Accession information dates the photo as 1906. Nevada Historical Society, Indian Photograph #550, Ethnic Collection.



Photo 7. Native American Settlement at Bullfrog, Nevada, 1906.

Photo shows a Native American camp at the edge of Bullfrog. Two dome-style shelters made of branches, saplings, and fabric and one commercially manufactured tent are visible in the foreground. In the background are Euroamerican-style buildings. A Native American woman and child are seated next to one of the dome shelters. Accession information indicates that the photo is from Bullfrog in 1906. Nevada Historical Society. Indian Photograph #550, Ethnic Collection.



Photo 8. Native American Residents of Rhyolite, 1907.

Photo shows a group of nine Native American individuals seated on the ground in front of a building. Photo has a handwritten caption across the bottom--"Some of Rhyolite's First Inhabitants". The signature A. E. Holt and the date April '07 are also written on the front of the photo. Nevada Historical Society, A. E. Holt Photograph Collection.

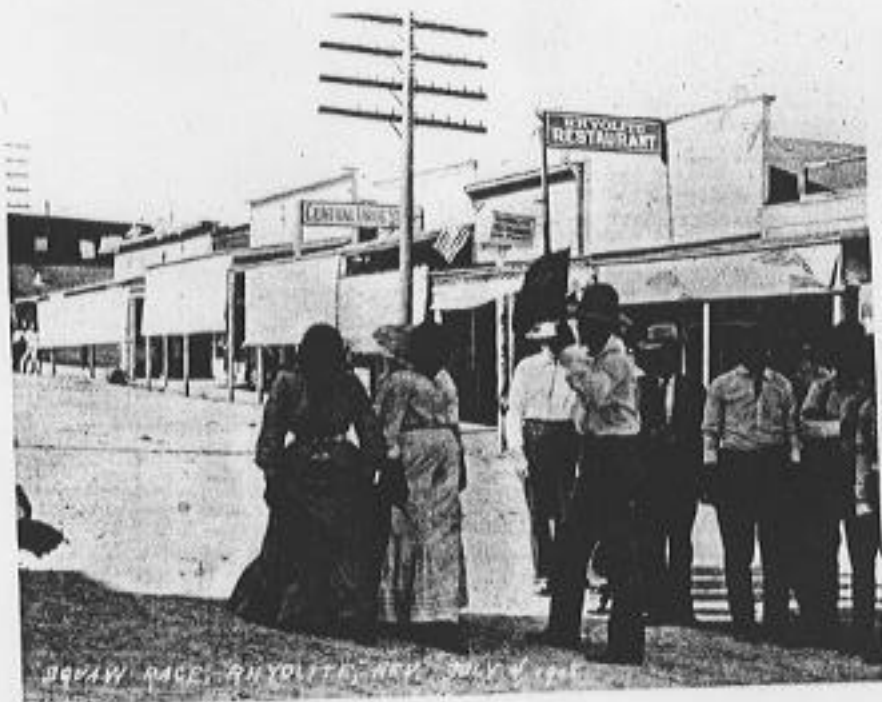


Photo 9. Native American Women in Fourth of July Foot Race in Rhyolite, 1908.

Photo shows two Native American women preparing to run a race, a man with a signal flag preparing to start the race, and a group of onlookers. In the background are businesses with signs confirming the location as Rhyolite. The photo is on a postcard. Across the bottom of the photo is a handwritten caption: "Squaw Race, Rhyolite, Nev. July 4, 1908. Nevada Historical Society, Indian Photograph #544, Ethnic Collection.

Although Euroamericans appropriated the bulk of the resources in the core oasis areas, remoter areas were much less impacted. All of the big producers during the boom years early in the century were outside the Nevada Test Site. Prospectors combed the entire region, but in most areas their intrusion was of limited duration. In the Nevada Test Site there was no significant permanent Euroamerican settlement, just a few marginal ranching operations and marginal mines. Much of the Nevada Test Site, then, continued to serve as a refuge region where Native American people continued to harvest wild plant and animal resources on a seasonal basis. Native American people retained effective control within these regions of refuge, retaining control over a base of resources they harvested both for subsistence and for commercial sale.

Some families avoided the Euroamerican settlements as much as possible and made their primary residence within this refuge zone. More typically, families made their primary residence in the labor camps and periodically travelled to the refuge regions to harvest wild plant and resources there. Describing a similar pattern around Pioche--where a mining boom occurred several decades earlier than in the Oasis Valley and Pahrump areas--Knack states that "Indians moved between Anglo-controlled towns and free native areas" (Knack 1986:97). Most families continued to rely upon wild food resources for part of their dietary needs, including wild seedgrains, pinyon nuts, and game. Indian people continued to harvest medicinal plants in refuge regions. Many Indian families marketed resources harvested in the refuge regions to Euroamericans in the towns. Indian people marketed pinyon nuts, firewood, animal skins, and basketry wares manufactured from wild plants. Local newspaper articles report that "Panamint Joe" Stuart marketed pinyon nuts and firewood in the towns (*Bullfrog Miner* vol. 2, no. 24, Sept. 7, 1906, inside p.); since "Panamint Joe" was a local Indian leader, he may have been acting as a marketing agent for products harvested by larger numbers of local Indian people. In marketing pinyon nuts, Indian people were marketing a product they had traditionally exchanged with other Native American groups, but now the market had expanded.

Native Americans even retained control of some springs. In Oasis Valley a community of Native Americans under the leadership of "Panamint Joe" Stuart continued to occupy a spring and ranch at the later site of Springdale until 1906, when "Panamint Joe" sold the ranch and the people moved to a location in the Grapevine Range (*Bullfrog Miner* vol. 2, no. 26, Aug. 31, 1906, p. 1, col. 2). In Ash Meadows, Indian families

retained control of several springs and continued to farm independent on their own holdings. Some of these Indian-operated farms in Ash Meadows sent produce to market in the Oasis Valley mining town (Bullfrog Miner vol. 1, no. 44, Feb. 3, 1906, p. 3, col. 4). As independent farmers, Native Americans capitalized on their long cultural experience in oasis cultivation in a desert environment. The 1910 census enumeration for Pahrump and Ash Meadows listed 9 Native American household heads as farm laborers and an equal number as farmers who owned their own land (U.S. Census 1910).

In the early 1900s, then, Native American subsistence continued to involve three complementary strategies--more or less permanent residence in labor camps and wage-labor for Euroamerican employers; period transhumance to refuge regions to harvest wild plant and animal resources; and continued independent cultivation by some families at some of the smaller springs.

Native American Labor Categories

Few Native Americans held steady jobs with regular wages. Most worked at intermittent or seasonal jobs as farm workers, ranch workers, cowboys, woodcutters, woodhaulers, teamsters, and laundresses. These are the occupations most commonly listed in the 1900 and 1910 census enumerations of Indian people in the area. A number of Native Americans men worked as guides and trackers, specialized jobs that capitalized on their superior indigenous knowledge of the region and employed them for limited periods of time. Many Native Americans worked as self-employed small scale entrepreneurs--farming, prospecting, harvesting and selling pinyon nuts and firewood, harvesting weaving materials and then making and marketing baskets.

Many Native Americans prospected for ore. Many worked as guide for Euroamerican prospectors, and in so doing helped locate many of the producing mines of the region. Many Native Americans also prospected on their own behalf and staked their own mining claims.

Among the Native American individuals from the region of the Nevada Test Site who were identified in newspaper or other sources as involved in prospecting or as owning mineral claims were Captain Jack (for whom Captain Jack Spring is named); Shoshone Johnny of the Panamint area (Lingenfelter 1986:20); Johnnie Peavine of the Oasis Valley area (Beatty Bullfrog Miner vol. 2, no. 7, May 5, 1906, p. 2, col. 2).

Bob Black and Mary Scott of Ash Meadows (Zanjani 1988:114-117); Panamint Tom, Hungry Bill and his son Tim Billson from the Panamint area (Greene 1981:371); Jim Monaghan, Joe Babbon, and Captain Mullen of the Searchlight area (*Tonopah Daily Sun* March 29, 1906, inside p., col. 1); John and Sammy Best of the Lida area (*Searchlight* vol. 6, no. 23, Nov. 8, 1907, p. 3, col. 6); and Chief Tecopa of Pahrump (Cook, n.d.:24). Panamint Joe Stuart, regarded by Euroamericans as the local chief of the Oasis Valley area, was co-owner of a number of mining claims, some of which he located himself (*Bullfrog Miner* vol. 4, no. 5, April 25, 1908, p. 8, col. 3; *Bullfrog Miner* vol. 4, no. 12, June 13, 1908, p. 5, col. 3). Other unnamed Native American individuals are mentioned in the mining town newspapers as having brought in rich ore to be assayed in mining towns (e.g. *Pioche Weekly Record* vol. 54, no. 6, July 31, 1903, p. 4, col. 4). Several hundred Native Americans under the leadership of Chief Johnnie Kay, a Shoshone Indian leader, reportedly sought mineral claims on the Walker River Reservation when that reservation was thrown open to mineral prospecting in 1906 (*Tonopah Daily Sun* Oct. 20, 1906, p. 1, col. 5). In 1912 an Indian man identified as "one of the Indians who found the Shoshone" mine took a sample of high grade ore to a broker in Goldfield. He did not reveal the location of the ore but was trailed by interested parties as far as Oak Springs before losing them in the Fortymile Canyon country (*Carrara Obelisk* vol. 2, no. 1, May 8, 1914, inside p., col. 3).

Several factors contributed to the pattern in which most Native Americans held seasonal, temporary, or intermittent jobs, many of them "unskilled" jobs. Primarily, Native Americans' limited command of English and of Euroamerican financial and legal arrangements excluded them from many jobs. Secondly, Euroamerican employers preferred to give long-term steady jobs with regular wages to Euroamericans rather than to Native Americans. Thirdly, Euroamerican owners of ranches and farms needed a flexible pool of workers who were available for hire to meet short term labor needs and who were able to supply much of their subsistence needs through their own efforts as horticulturalists and as harvesters of wild food resources. By allowing Native Americans to live in makeshift shelters in labor camps located on ranches or on the outskirts of town, Euroamericans were assured of a readily available pool of workers who could be hired to work only as much as needed. Living in traditional or modified traditional shelters and subsisting on diets at times heavily reliant on wild food resources, Native Americans were able to survive with little cash income during periods of unemployment or

underemployment in the Euroamerican economic sector. Most of their jobs in the Euroamerican sector provided only a partial or intermittent livelihood and meant that Native American people remained dependent upon traditional harvesting activities for part of their livelihood. The seasonal or intermittent nature of most of their jobs in the Euroamerican sector was compatible with the scheduling of traditional harvesting activities, and with the persistence of traditional regional social events associated with fall harvesting.

Resource Appropriation

Given that many Native Americans were involved in prospecting and staking out mineral claims during this period, mineral resources constituted an important arena of competition with Euroamericans, an arena in which the latter steadily encroached upon and appropriated Indian resources. Sometimes this was a matter of Euroamericans claiming ground that Native Americans had already claimed. Often it was a matter of unequal partnerships.

Native Americans who knew the terrain and had located a lode would enter into partnership with Euroamericans who understood the legal and financial system. Almost invariably, Euroamericans used their superior knowledge of the legal/financial system to shortshift their Native American partners. The Native American man who helped Bob Montgomery locate what became the Montgomery Shoshone mine - one of the most profitable mines in the region - apparently received only limited cash payments and vague, impersonal recognition in the naming of the mine (Weight and Weight 1980:27-28; Lingenfelter 1986:20; *Beatty Bullfrog Miner* vol. 1, no. 42, January 6, 1906, pp.3-4). In 1906 a Native American named Johnnie Peavine filed suit against the Cliffords, a Euroamerican couple. Johnnie Peavine and his wife had discovered ore and entered into partnership with the Cliffords, who were to handle legal matters and develop the property. The Cliffords did not honor their promise to pay Johnnie Peavine, although they sold the mine for about a quarter of a million dollars. Judge Breen heard the case in Tonopah and ruled that "an Indian can own and hold real estate in the form of mining claims, sue and be sued the same as other citizens of this country" (*Beatty Bullfrog Miner* vol. 2, no. 7, May 5, 1906, p. 2, col. 2). In 1907 Native Americans who had discovered rich ore in the Greenwater area of the Panamint Range sought assistance from Euroamerican friends, charging

that Clarence Eddy, who owned a nearby claim, was encroaching on their discovery (*Bullfrog Miner* vol. 3, no. 15, July 8, 1907, inside p., col. 5; Greene 1981:374-375). Reportedly Judge L. O. Ray, president of the Rhyolite Mining and Brokerage Company, agreed to assist the Native Americans in securing their claims, in return for an interest in the claims.

During this period Euroamericans also completed the process of appropriating most of the water resources of the major oasis areas. Many springs that had long been occupied and in many cases cultivated by Native Americans had in the late 1800s been appropriated by Euroamerican settlers. During earlier periods, Euroamerican demand for water had been limited and Native Americans had continued to occupy and use many of the springs. As the mining boom got underway, more and more water resources were incorporated into Euroamerican legalisms impenetrable to Native Americans. Corporations bought springs from Euroamericans who had settled only shortly before and often had not established clear title. More and more springs were tapped into pipelines to supply the mining mills and towns.

Demographic Decline

During this period there was apparently a continued demographic decline in the local Native American population. Harsha White, resident of the Pahrump Valley area since the 1870s and a local census canvasser in the 1900 census, observed a continued decline and attributed it to venereal disease from contact with Euroamericans, deterioration of diet, and the effects of liquor (*Beatty Bullfrog Miner* vol. 1, no. 27, Sept. 23, 1905, p. 1, col. 1). Alcohol was a contributing factor in many violent deaths of Native American men. Drunken quarrels in the labor camps often resulted in the death of one Indian person at the hands of another. Many American Indian individuals were also murdered by Euroamericans in incidents involving alcohol and/or racist attitudes toward Indian people.

Interethnic Relations

During the mining boom period, the Native American population was overwhelmed by the influx of Euroamericans. Native Americans swiftly became a tiny minority and were perceived by Euroamericans as a rapidly vanishing "race", no longer as a numerous and threatening adversary. Native Americans now provided exotic local color, as epitomized in the

public performances of traditional dancing orchestrated by "Panamint Joe" Stuart, the Indian leader of the Oasis Valley area. Stuart arranged such public performances on a number of occasions--including one on the Fourth of July, 1908 at the opera house in Rhyolite (*Bullfrog Miner* vol. 4, no. 5, April 25, 1908, p. 8, col. 3; *Rhyolite Herald* vol. 4, no. 8, June 17, 1908, p. 5, col. 5; *Bullfrog Miner* vol. 4, no. 5, April 25, 1908, p. 8, col. 3; *Rhyolite Daily Bulletin* vol. 1, no. 228, October 7, 1908, p. 4, col. 1). These dances were billed as "war dances". A few years before, news that Native Americans were performing a "war dance" had made Euroamericans fearful. Now a "war dance" had become a harmless entertainment announced in the local newspapers.

Though Native Americans were no longer in a numerical position to offer serious resistance to Euroamerican people, many Euroamerican settlers continued to express their hostilities and fears in racist incidents including numerous murders of Native Americans upon the slightest excuse or without any excuse other than drunkenness on the part of the Euroamerican perpetrator. Hostile, prejudicial, and exploitative attitudes on the part of Euroamericans toward Native Americans are well illustrated by the killing of "Little Charley" or "Indian Charley" by Charles Clay at the Pahrump Ranch. Clay, a Euroamerican, went to the Native American camp on the Pahrump Ranch and demanded of several Native American men that they procure a woman for him to sleep with. When the men refused, Clay shot and killed "Indian Charley". A posse of Native American men accompanied the sheriff in pursuit of Clay and helped apprehend him (*Rhyolite Daily Bulletin* vol. 1, no. 4, Sept. 26, 1907, p. 1, col. 2; *Bullfrog Miner* vol. 3, no. 27, Sept. 28, p. 10, col. 3).

Sociopolitical Organization and Leadership

Many of the labor camps were located on or near the traditional site of Native American villages, but the political and cultural situation of Indian labor camps differed from the patterns that had characterized traditional villages. Some of the labor camps were new settlements with mixed populations drawn from a variety of local groups. In the labor camps, intermarriages between Southern Paiutes and Western Shoshones became more common.

Even with the new labor camps and the radical changes in Oasis Valley, there continued to be a recognized local Indian leader for the Oasis Valley district--"Panamint Joe" Stuart (Lingenfelter 1986:21).

"Panamint Joe" Stuart had ties of kinship to the previous district leader, also named Stuart (Stewart 1938:93-94). "Panamint Joe" Stuart and a group of some 25 Indian people continued to occupy a ranch at a large spring at the later site of Springdale until 1906, when "Panamint Joe" sold the ranch and he and all or many of the people who had lived with him moved west to the Grapevine Range (*Beatty Bullfrog Miner* vol. 1, no. 29, October 7, 1905, p. 2, col. 2; *Bullfrog Miner* vol. 2, no. 26, Aug. 31, 1906, p. 1, col. 2). Even after selling his ranch, "Panamint Joe" continued to be widely perceived as the Indian leader of the district, remained active in local affairs, and performed a number of leadership functions. "Panamint Joe" Stuart officiated at ceremonies honoring the death of Indian persons (*Bullfrog Miner* vol. 2, no. 18, July 27, 1906, inside p., col. 1). He apparently served as a marketing agent for pinyon nuts and firewood harvested by Indian people (*Bullfrog Miner* vol. 2, no. 24, Sept. 7, 1906, inside p.). He was involved in mine-claim partnerships and owned a number of mining claims (*Bullfrog Miner* vol. 4, no. 12, June 13, 1908, p. 5, col. 3). "Panamint Joe" was consulted by Euroamericans when they sought information about crimes, deaths, or disputes involving Indian people (*Bullfrog Miner* vol. 4, no. 29, Oct. 17, 1908, p. 8, col. 5). He arranged a number of public performances of Indian dances for Fourth of July celebrations and other occasions (*Rhyolite Herald* vol. 4, no. 8, June 17, 1908, p. 5, col. 5). Panamint Joe Stuart frequently served as a guide for Euroamerican travelers and prospectors (Weight and Weight 1953:17;

Chief Tecopa of Pahrump apparently played a similar role as district leader of Pahrump Valley (Lingenfelter 1986:22; Boyer 1967:76-77), and was apparently regarded by Ash Meadows people as their leader as well (Stewart 1938:185). The early settlers of the Pahrump Valley, and later George Montgomery, dealt with Chief Tecopa in developing their mining enterprises in the area; Tecopa reportedly guided them to ore in several locations (Doherty 1974:168, Cook n.d.:24). In the late 1800s Tecopa sent Indian runners to miners in Calico warning them of a planned raid by some Indian men (Boyer, n.d.:77). In 1905 some one hundred Southern Paiute people assembled at Pahrump for funeral ceremonies honoring Tecopa's death one year earlier, in the traditional pattern (*Beatty Bullfrog Miner* vol. 1, no. 27, September 23, 1905, p. 1, col. 1).

While some aspects of traditional patterns of leadership remained in effect in the early 1900s, the functions of the leaders were modified in response to Euroamerican settlement. Leaders now had to have command of the English language and some understanding of Euroamerican customs

and legalisms. They acted as culture brokers between their people and the Euroamerican sector and served as economic agents for their people arranging jobs with Euroamerican employers and marketing products like firewood, pinyon nuts, and baskets. They sometimes served as labor contractors and even labor supervisors. They mediated with functionaries when people in the labor camp were involved in disputes or crimes. In the past, local band had been closely tied into a political network involving all of the ethnic group's bands and its regional and national leaders. Now local Indian leaders operated much more independently developing new entrepreneurial forms of leadership that were attuned to Euroamerican patterns as well as to Native American traditions.

Cultural Persistence

Well before the mining boom, Native American people had adopted Euroamerican-style clothing and industrially-produced tools and equipment. During the mining boom, if not before, most Native American men learned some English (U.S. Census, 1910), enough to enable them to function in job situations with Euroamerican employers. Native Americans added these elements of Euroamerican culture but they retained much of their traditional culture. Most Native American women and children had little or no command of English (U. S. Census, 1910). Native Americans continued to harvest wild plant and animal species and to rely on wild food harvesting as a major part of their diet. Marketing of traditional Native American resources including pinyon nuts was one of the ways Native Americans participated in the Euroamerican sector.

There was little missionary activity in the region and it can be assumed that few Native Americans adopted Euroamerican religious beliefs or practices during this period. Native Americans continued to observe traditional ceremonies connected with burials. A year after the death of Chief Tecopa of Pahrump, he was honored with a traditional Southern Paiute one-year honoring ceremony; ponies were killed and clothing was burned, following the traditional custom for honoring the dead (*Beatty Bullfrog Miner* vol. 1, no. 27, Sept. 23, 1905, p. 1, col. 1). In 1906 a woman named Lulu Jackrabbit was struck and killed by lightning at "Panamint Joe's" ranch in Oasis Valley. She "was buried according to the native rites and ceremonies. Panamint Joe officiated...[and] only two white men were present" (*Bullfrog Miner* vol. 2, no. 18, July 27, 1906, inside p., col. 1). In 1909 Indian Henry, brother of M. M. Beatty's Native

American wife, was killed in Pahrump by two other Native American men, one of them the son of Ash Meadows Charley. The issue precipitating this murder was reportedly Indian Henry's failure to honor traditional funeral customs. Indian Henry had continued to use a wagon belonging to the Black family of Ash Meadows after Bob Black had killed several members of his own family. According to tradition, the wagon was part of the property that should have been destroyed at the one-year ceremonies honoring those deaths (*Bullfrog Miner* vol. 5, no. 18, July 24, 1909, p. 4, col. 1).

The Native American Resource Base Expands: 1911-1940s

Demographic Change

During the boom years of the early 1900s, Native Americans became a tiny minority, overshadowed and dominated by Euroamericans. However, the mining boom peaked and faded within less than a decade. The boom that centered in the Oasis Valley area began in 1904 and was winding down by 1910. After this, the Euroamerican population declined swiftly. Rhyolite and many other mining towns and camps faded into ghost towns. By the 1930s even railroad service was terminated and the tracks were removed. Mining and prospecting continued on a much reduced scale. During a few boom years, the Euroamerican population of the region had grown to many thousands. But within less than a decade the Euroamerican population had again declined to less than a thousand. Native Americans were still a minority, but no longer a vastly outnumbered minority as they were during the few years of the mining boom. The interval during which Native Americans had been vastly outnumbered had lasted less than a decade, not long enough for a generation of Native Americans to have emerged who had experienced the world only from the perspective of a vastly outnumbered and vanishing minority. Native Americans continued to derive part of their livelihood from their traditional transhumant strategy -- harvesting wild food resources; producing, using, and marketing traditional crafts; harvesting and using traditional medicinal plants.

In 1928 rich ore was discovered near Cane Spring, within what is now the Nevada Test Site. The camp of Wahmonie sprang up and quickly reached a peak population of perhaps as many as 2,000. Wahmonie was another ephemeral explosion of the Euroamerican population. Within a

few months, Wahmonie was on its way to becoming another ghost camp (Kral 1951:206; Paher 1970:32).

In the late 1930s, Native American people still comprised a substantial portion of the population in the region of the Nevada Test Site. In Oasis Valley, Native Americans constituted over one-fourth of the population. A 1937 B.I.A. report estimated that in the area of Nye county encompassing Beatty, Pahrump, and the region in between, there were some 30 Native American families and apparently some 120 Native American persons (B.I.A. 1937:4,7,17,21). According to the B.I.A. report, there were 15 Native American families and a total of 56 Native American individuals living at Beatty, with another four families and an unspecified number of persons living two miles away at the Lockhart Ranch (B.I.A. 1937:4,7). This makes a total of some 75 Native Americans out of a total population of approximately 250 in the Beatty area. The same study reported that there were two Native American families - including eight persons - living in Ash Meadows; five Native American families - including approximately 30 persons - living in Pahrump Valley; and several families living at remote locations not specified in the report and not visited by the researchers (B.I.A. 1937:4,7,10,17,21). These remote locations almost certainly included some of the springs in the Nevada Test Site area. Captain Jack reportedly resided at a rock shelter north of White Rock Spring through the late 20s until his death in 1928 (*Goldfield News and Beatty Bulletin* vol. 44, no. 50, April 23, 1948, p. 2, col. 4). Native Americans continued to occupy White Rock Spring itself during the same period, later abandoning a 1928 Buick there, the remains of which are still visible (Worman 1969:39-40; Ted Shaw, personal communication).

The improved demographic position of Native Americans vis a vis Euroamericans in Oasis Valley after the mining boom had ended was reflected in the school age population. Ert Moore, who taught in Beatty's public school during the late '30s and early 40's, reported that during his tenure a majority of the students in the public school at Beatty were Native Americans; in 1936-7 about 25 of the 40 elementary students were Native Americans, as were 8 of the 10 high school students (Moore 1979:20-21). Moore observed that English was a second language for most of the Native American students during this period (Moore 1979:20-21).

Competition Over Water Resources

After the mining boom had faded, Native Americans in Ash Meadows began to receive some belated attention and assistance from Indian Agents and state officials. In the years after World War I there were a number of disputes over water resources between Native Americans and Euroamericans in the Ash Meadows area. Euroamerican settlers sought to appropriate springs long occupied by Native Americans and used to irrigate small farms. Much of the land was government land and although they had long occupied the springs, Native Americans had not established title within the Euroamerican legal framework. Indian Agents Lorenzo D. Creel and L.A. Dorrington assisted Ash Meadows Native American people with the paperwork and correspondence involved in supporting their claims. Courts and commissions resolved several cases in favor of Native American claimants.

One dispute concerned water rights to "Big Spring" in Ash Meadows. This dispute was between Mrs. Etta E. Garner, a Euroamerican woman, and William G. Morris, a Cherokee man who had settled in Ash Meadows during the mining boom period. Morris was assisted in filing his claim by Nevada Indian agents. A U.S. Commissioner heard the case and upheld Morris' claim (Correspondence Files, Lorenzo D. Creel, 1917,1918). Another dispute was between "Ash Meadows Charley", long-time resident of Ash Meadows, and his Euroamerican neighbors. C.G. Davis claimed that Ash Meadows Charley had sold him a spring. Ash Meadows Charley testified that he had accepted payment from Davis in exchange for permitting the latter to use water from the spring for one year (Correspondence File, Lorenzo D. Creel, 1917).

The dispute illustrates the very different perceptions Native Americans and Euroamericans had about such transactions. In the Euroamerican understanding, when Native Americans were paid for the use of a spring, the Euroamericans believed that they had acquired outright ownership of the spring and that the Native American people had relinquished any prior rights. In their understanding of the same transaction, Native American people believed that they had accepted gifts or payments in return for sharing the use of water sources over which they retained jurisdiction -- much as one Native American group traditionally granted another Native American group permission to use resources located within the territory of the first group.

Euroamericans also sought to establish claims to three small springs in Ash Meadows that had been left to three orphaned Paiute children by their grandfather -- children then under the guardianship of two Shoshone residents of Ash Meadows, Mary Scott and Shoofly James (Correspondence File, Lorenzo D. Creel, 1920). The springs were on government land, and the grandfather had never established legal title within the Euroamerican framework. As of 1937 a small Native American community led by Mary Scott was still farming in Ash Meadows. Mary Scott claimed to own the land, which the B.I.A. regarded as public domain land. Clear title still had not been established but a court had upheld the right of the Native American community to use the water of the springs (B.I.A. 1937b:10).

Employment

In the late 1920s and early 30s many Native Americans from the Oasis Valley and Ash Meadows areas were employed in the construction of Scotty's Castle (Sennett-Walker 1987:83). Many left jobs they had long held on local farms and ranches to take higher paying construction jobs at Scotty's Castle, but this was another temporary boom. When construction was completed, many Native American workers found they could not go back to their earlier jobs on farms and ranches. Euroamerican owners had replaced them with recent emigrants from Mexico and elsewhere. While employed on ranches and farms, Native Americans had typically been free to reside in labor camps on those farms and sometimes to cultivate their own subsistence crops there. Having lost their jobs in the agricultural sector, Native Americans also lost the option of living in the labor camps (B.I.A. 1937b:2,4). This was apparently one of the factors responsible for an increasing diaspora of Native Americans from the region of the Nevada Test Site in the 1930s and 40s. For those who stayed in the region, public works programs were the leading source of jobs during the late 30s (B.I.A. 1937b:2,4,16,17,22).

Persistence of Transhumant Harvesting Practices

Reports prepared by the B.I.A. in cooperation with the Soil Conservation Service in 1937 indicate that Native Americans in the region of the Nevada Test Site continued to rely on traditional strategies for part of their subsistence and also for part of their cash income. They continued

to derive part of their diet and part of their cash income from the harvesting of wild food resources. Specialists continued to produce and sell traditional crafts and to harvest, use, and market traditional plant medicines. Native Americans at Ash Meadows continued to derive much of their diet from small-scale farming (B.I.A. 1937b:11,12). Nearly all the Native American people at Beatty continued to leave in the fall to harvest wild foods in the surrounding mountains, leaving the classrooms more than half-empty at that time of year (Moore 1979:25). The B.I.A. report indicates that for the 20 families surveyed (out of a total of 30 or more) in southern Nye County, 5.2% of their aggregate cash income came from the sale of wild foods including pinyon nuts; 1.6% from the sale of handcrafts including baskets; and 1.1% from the sale of agricultural products (B.I.A. 1937b:22). Wild foods were particularly important for Native Americans in Pahrump Valley, where for the four families surveyed the sale of wild foods accounted for 23.1% of their aggregate cash income (B.I.A. 1937b:16-17).

It should be noted that these reports understate the importance of wild foods and of subsistence horticulture in the overall livelihood and diet of the Native American population. It should also be noted that the B.I.A. report did not attempt to document what portion of non-cash (subsistence) livelihood came from horticulture and from wild foods. If the contribution of wild foods and subsistence horticulture to the families' diets had been documented, wild foods and subsistence horticulture would have accounted for much larger fractions of the overall livelihood of Native American families. In addition, families surveyed were those in the most accessible locations. It is probable that those in the more isolated locations who were not surveyed derived an even larger portion of their overall livelihood from wild resources.

Several sources confirm that Native American plant specialists continued to harvest a wide variety of medicinal plants and that traditional curers continued to use these plants in treating their people. Ert Moore lamented that the local medicine man still had considerable influence (Moore 1979:20-21). In the late 1930s Percy Train and his associates interviewed Native Americans at Beatty in preparing their study of Native American use of medicinal plants in Nevada. Train et al. reported that two of their most informative interviewees lived in Beatty, one of them a practicing medicine man whose knowledge and use of medicinal plants was extensive (Train et al. 1974:1,4). Train and colleagues noted that Native American plant specialists received high prices for their medicine,

often taking care to thoroughly pulverize plant materials so that Native Americans who bought the medicines could not identify the plants and gather them on their own (Train et al. 1974:4).

Recovery of Resources

In the late 30s and early 40s, small Indian reservations were finally established at a number of locations in central and southern Nevada and in the Owens Valley region. Creation of these reservations meant that Native American people's control over resources expanded during this period. The reservations were small but they did provide Native American people in the region of the Nevada Test Site with a more assured resource base than they had for many decades, and thus a more secure basis for Native American political organization. No reservations were created in the region of the Nevada Test site, so in order for Native Americans from this region to take advantage of resources on the reservations, families had to relocate away from their home territories. Creation of reservations during this period was one of the factors making for a diaspora of Native American people from the region.

A New Assertion of Euroamerican Dominance: the 1940s and 50s

By the mid-1940s a new phase of Euroamerican development was underway in the region. Lands in southern Nevada began to be progressively closed to public use, with the creation first of the Tonopah Bombing and Gunnery Range and then the Nellis Air Force Range and the Nevada Test Site. These actions constituted a decisive assertion of Euroamerican dominance in the region. An extensive area was closed to public use -- an area that had continued to be used by Native American people for the harvesting of traditional plant foods, medicinal plants, and game animals.

Native Americans had continued to reside at some of the springs, as well as occupying seasonal camps at a variety of locations. Traditional resources harvested in these hinterland areas had continued to be a significant part of the overall subsistence strategy of many Native American families. Withdrawal of these lands stripped away much of the resource base Native American people in the region had continued to rely upon. Despite the regulations, some Native American people ignored the

rules and continued to carry their traditional harvesting activities on the military reservations and the Nevada Test Site. But a definitive end had been put to residence at springs within the closed areas, and the possibility of harassment or legal proceedings deterred many from even short-term use of the area. For Native American people, these developments meant a substantial reduction in their access to and ability to compete for resources.

The withdrawal of these lands was one of many developments contributing to growing diaspora of Native American people from the region of the Nevada Test Site to the recently created reservations and to cities, particularly Las Vegas. For many this was a wrenching period, involving relocation to distant cities or reservations. For those who stayed, closure of lands meant a curtailment of the wild food harvesting strategies which Native American people had continued to practice until nearly the middle of the twentieth century.

Renewed Native American Competitiveness: 1960s through 1980s

Events in Oasis Valley and Pahrump Valley suggest that although Native Americans now comprised a small portion of the population, they were not as marginalized as they had been for many decades - including the 1930s when public works jobs had been the major source of income. Gilbert Landis, a Paiute man, was employed as the deputy sheriff in Beatty from 1953 to 1968; from 1957 to 1968 he was the only full-time law enforcement officer present in the Oasis Valley area on a day to day basis (*Tonopah Times Bonanza and Goldfield News* July 5, 1968, p. 4, col. 1). Joseph Strozzi, son of a Euroamerican father and a Shoshone mother, served as a deputy sheriff in Beatty during the late 1950s as well (Oath of Office, 1959). In 1971 a public ceremony was held in the cemetery at Pahrump to dedicate an official historical monument honoring Chief Tecopa (Lynch 1982:191).

In the period since 1960, Native American people have adopted a variety of political and legal strategies that have augmented their ability to compete for social resources and natural resources. Greater political assertiveness by Native Americans in the southern Great Basin has in part been built on the small but significant base of the new reservations. Nationwide political mobilizations of Native American peoples in the sixties and seventies also contributed to the development of a more

assertive posture.

Since the 1960s, reservation-based tribal governments and groups of urban Native Americans have launched political campaigns aimed at greater control over their region's resources and patterns of development. Native American people with historic ties to the Nevada Test Site have increasingly asserted themselves on political issues in the region. Western Shoshones have mounted campaigns aimed at recovery of their traditional lands (Clemmer and Stewart 1986: 556). Land claimed by Western Shoshones include much of the Nevada Test Site. Western Shoshones voted to refuse the monetary award that was the outcome of their case before the Indian Claims Commission, underscoring that their demand was for the return of their land rather than for money (Clemmer and Stewart 1986:556). Western Shoshones opposed state and federal hunting regulations and pinyon-juniper clearance operations on the lands they claim (Clemmer and Stewart 1986:556) and actively campaigned against a massive mobile-basing system for MX missiles proposed for the region.

Since the 1970s many Native American tribes in the region have been actively involved in cultural resource studies related to various development projects, including the Intermountain Powerline Project and the proposed Yucca Mountain Nuclear Waste Storage Project. Representatives of these tribes have visited sites that would be affected by the projects, expressed their concerns about potential impacts on cultural resources, voiced opposition to projects, and set priorities for mitigation measures regarding Native American cultural resources if projects are carried out despite the opposition of Native American groups. Currently Native American people in Pahrump Valley are petitioning for recognition as a federally acknowledged tribe (Office of the Federal Register 1987).

Conclusion

Since first contact, Native Americans and Euroamericans in the region of the Nevada Test Site have engaged in a protracted competition for resources. Indian people utilized varying adaptive strategies in response to fluctuating Euroamerican pressures upon their resources, population, political organization, and ethnicity. These strategies varied over time and space in response to fluctuations in the ratio of Native American population to Euroamerican population and in response to changes in Euroamerican strategies of development. Adjustments in

systems of sociopolitical organization and ethnicity were among the more important dimensions of change in adaptive strategies made by Native American people in the region in order to compete for resources and to persist as a people and as a culture.

CHAPTER FOUR SPATIAL ANALYSIS OF NATIVE AMERICAN CULTURAL RESOURCES

American Indian people have lived on and around Yucca Mountain for thousands of years. Stone spear points, called Clovis points, have been found by archaeologists at the foot of Yucca Mountain. These spear points document that Indian people hunted large game animals in this area as much as ten thousand years ago. During this long period of occupation Indian people left many artifacts including stone tools, fiber sandals, rabbit skin blankets, willow baskets, bundles of hunting trap triggers, and symbols pecked on stone boulders. After trade with Euroamericans began, Indian people left new types of artifacts such as stones for weighing metal traps, tin cans used to hold candles, shovels, stone cabins, and even one old car. While the Indian people made and used these artifacts they occupied places such as rock outcrops where stone tools were shaped, springs where plants were grown, shallow caves where people sought shelter for themselves and a place of storage for surplus food and equipment, sandy flats where seeds were gathered and processed, and high points where people gathered to conduct religious ceremonies. When Indian people died they were buried in shallow self-covering graves, often near to where they had lived and worked. The spear point, the tin can, the old car, the burial, all are physical evidence of the culture history of Indian people in the Yucca Mountain area. As such they are significant to Indian people, western scientists, and part of the cultural heritage of all United States citizens.

This chapter analyzes American Indian cultural resources by spatial units. Unlike Chapter Three which was organized chronologically and Chapter Five which focuses on one cultural resource, this chapter is concerned with understanding how the distance between cultural resources was a factor in their use and meaning for Indian people. The chapter also presents a site-by-site description of cultural resources.

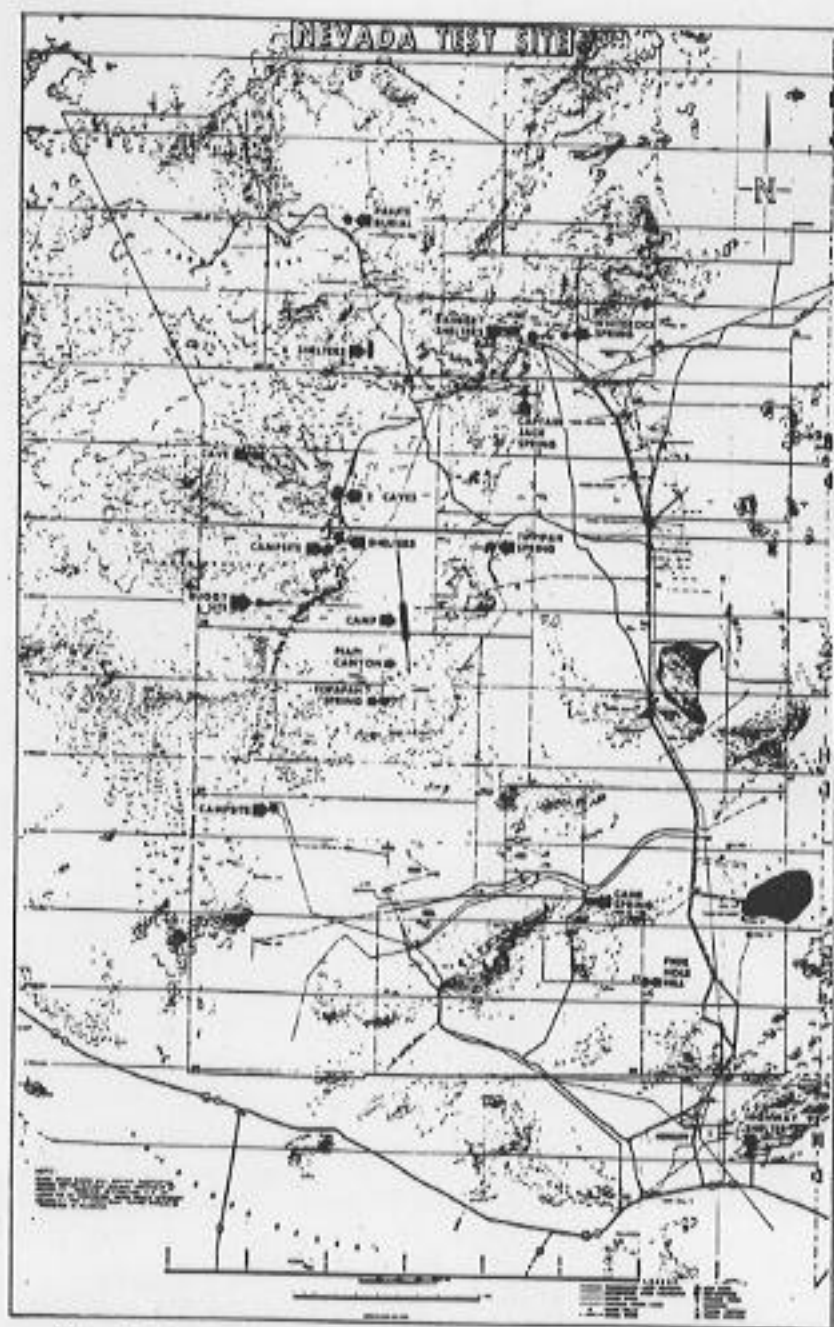
Indian people representing the sixteen involved tribes visited the 70,000 square acre Yucca Mountain study area (Map 1) to look at and interpret the cultural resources left there by Indian people. This chapter

summarizes interpretations provided by American Indian people who visited during the archaeology (Stoffle et al. 1988) and ethnobotany research (Stoffle et al 1988). These interpretations are supplemented by interviews with Indian people conducted as part of the ethnohistory research and by findings from the ethnographic and historical literature (Stoffle, Olmsted, and Evans 1988). The full study design and chronology of activities are discussed in Appendix A.

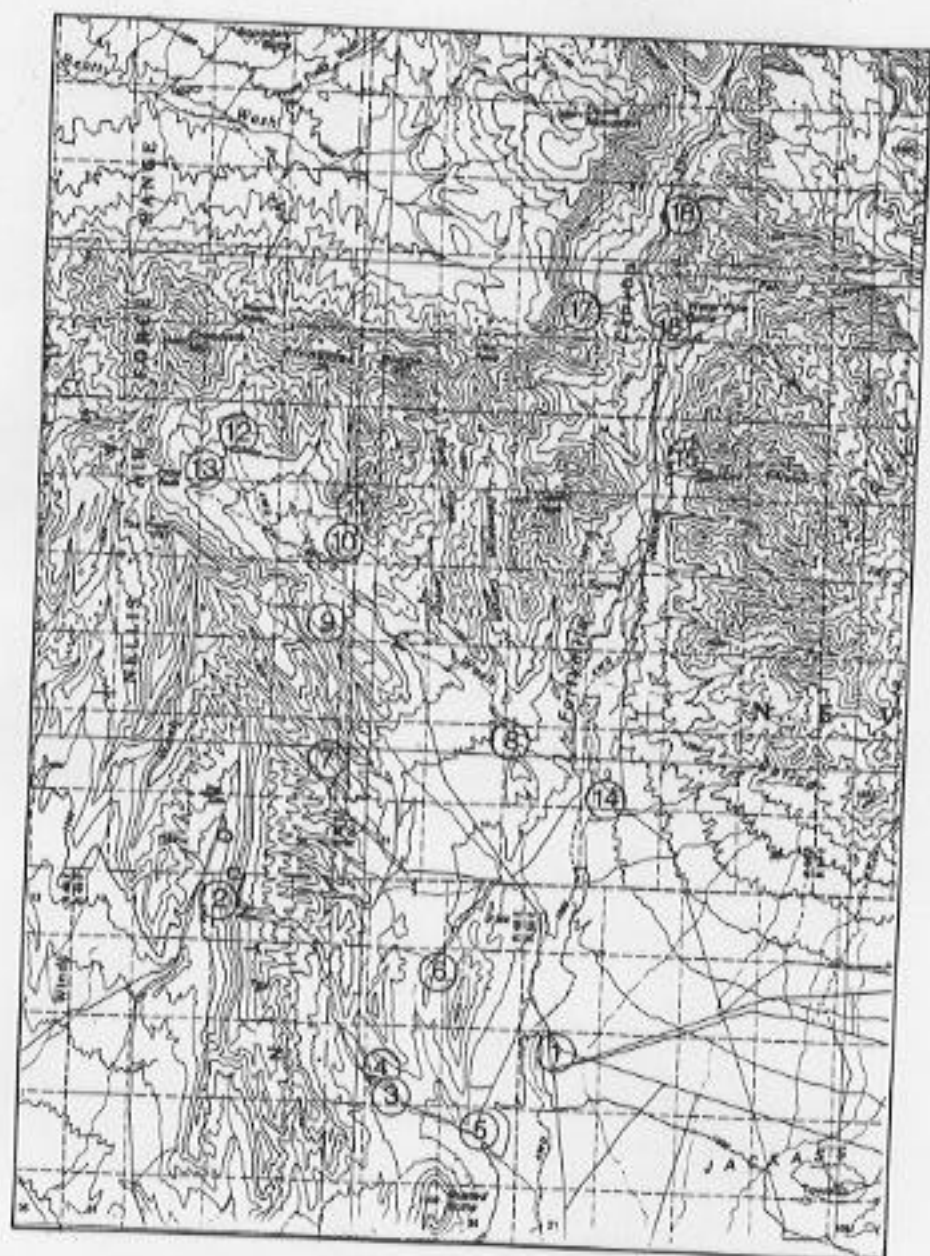
Because most portions of the study area have been closed to the public since the early 1940s, the research was designed around the assumptions that most Indian people would not have first-hand knowledge of the study area and probably would not be willing to discuss archaeological sites before making the visit. Based on these assumptions, and the requirement that the location of visits be approved by Nevada Test Site administrators as much as two weeks before the site visit, the research design called for sites to be selected without input by the Indian people.

Indian people visited archaeology sites that had been chosen through interactions between ethnographers and archaeologists. Location of these sites are shown in Maps 7 through 10. Based on past studies, ethnographers anticipated the types of sites Indian people would desire to visit. Then, knowledgeable archaeologists were asked to select specific examples of these general types of sites. Archaeologists from the Desert Research Institute recommended visits to sites that represented a cross section of the types of archaeological resources identified by previous archaeological research (cf. Pippin 1984; Pippin and Zerga 1983; Worman 1969).

Two overview locations were visited before specific sites were visited in the Yucca Mountain study area. When Indian people observed areas they wanted to visit or knew of more distant locations where archaeological or botanical resources were located, these requests were met. For the most part, however, Indian people interpreted archaeological or botanical resources identified by others. In addition, the data gathering portions of the research necessarily focused on specific sites rather than the larger units. The present analysis, however, attempts to analyze these data from the spatially larger perspectives so often used by Indian people.



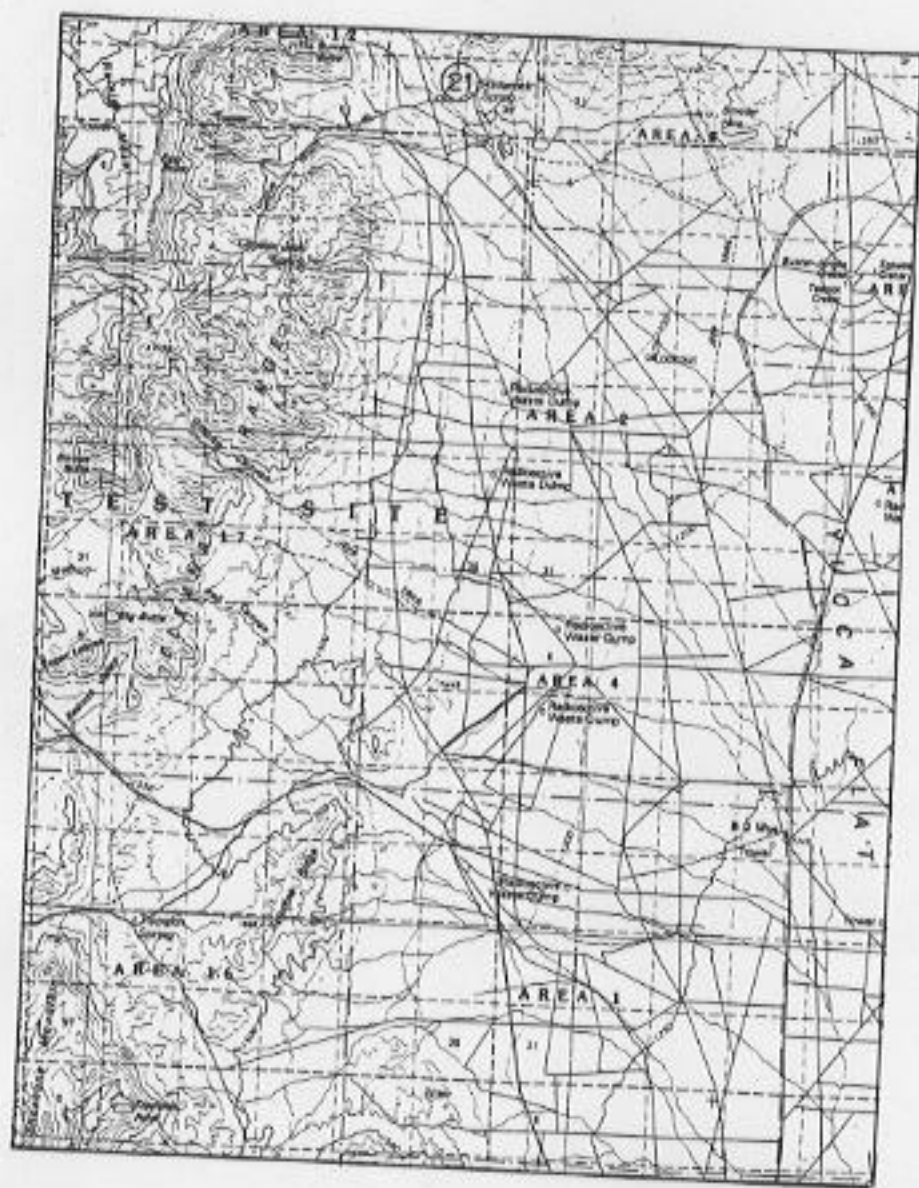
Map 7. Some Archaeological Sites on the Nevada Test Site
(from F. C. V. Worman 1969)



Map 8. Archaeological Sites #1 through #18 Visited by
Native American Representatives and Ethnographers



Map 9. Archaeological Sites #19 and #20 Visited by
Native American Representatives and Ethnographers



Map 10. Archaeological Site #21 Visited by
Native American Representatives and Ethnographers

Units of Spatial and Social Analysis

Previous American Indian cultural resource studies documented that Indian people tend to understand archaeology in terms of an occupational complex model, in which individual resources are perceived and evaluated as connected together into spatially larger patterns of use. In this report we refer to these larger patterns of use as (1) *local use areas*, (2) *districts*, and (3) *nations*. Nations encompass dozens of districts, with each district constituting a semiautonomous local sociopolitical unit with a resource base capable of supplying all or nearly all of the year-to-year needs of the people of that district. Each district includes many local use areas.

Nations and Holy Lands

The largest scale unit of analysis that is essential for understanding occupancy and use in the Yucca Mountain area is the nation. What is now the Nevada Test Site encompassed portions of the territories of both the Southern Paiute nation and the Western Shoshone nation (see Maps 2 and 4). Each of these nations was an ethnic unit, all of whose sub-units (districts) were affiliated, interacted economically and politically, and had a common self-definition. Key elements in people's self-definition as an ethnic nation and in the definition of the nation's boundaries were the sharing of a common language distinct from the language of neighboring nations (Stewart 1966) and the sharing of a common land. The nation's territory was conceived of by Indian people as a holy land, a land of origin, a land given to them to inhabit and manage as a people. Each of these nations existed in reference to a bounded territory that encompassed dozens of semiautonomous districts. The location of national boundaries undoubtedly changed over the course of time. Each nation had its own network of political organization and leadership. Each had national-level patterns of political interaction for the purpose of managing resources, exchanging specialized goods throughout the nation, and adjusting population to resources.

Native American persons perceive that they and their local communities comprise a portion of an ethnic nation. Traditional Native American ethnic nations share some but not all of the characteristics of modern nation-states which first emerged in Europe. It is beyond the scope of this report to argue whether Native American ethnic nations are or are not nations according to various possible definitions. Rather, this

report recognizes that Paiute and Shoshone people perceive of themselves as being members of Native American nations that existed before the arrival of Euroamericans.

Districts

Nations are composed of regional units referred here as districts. Steward introduced the term *district* while discussing the people of Oasis Valley, near Beatty, and of the White Rock Spring area, near the Belted Range:

Some detailed information is available concerning two population centers, the vicinity of Beatty and the Belted Range, where, because there was an unusual number of springs, winter villages were clustered. Each of these centers is, in a sense, a district, for the residents naturally found it most convenient to associate with their nearby neighbors....It was probably rare that each place had a festival the same year; instead, the two districts seem to have alternated each year, playing host to each other....Warfare was unknown in these districts...To the extent that each was independent, having its own chief, gathering seeds in its own locality, and holding its own rabbit hunts and festivals, it approximated a band....In spite of these varying outside associations, however, members of each district usually cooperated with one another in the few communal affairs and had a local chief to direct them... (Steward 1938:93)

Drawing on archaeological, ethnographic, historical and oral history data, the present research concludes that there were three traditional districts that intersected within the Nevada Test Site. The *Ogwe'pi* (Oasis Valley) District and the *Eso* (White Rock Spring) District are located in the Western Shoshone nation. The Ash Meadows District is located in the Southern Paiute nation. The districts, and by implication the two nations, apparently converged within the Nevada Test Site at the northern end of Fortymile Canyon (See Map 4).

The concept of a district as a sociopolitical and geographical unit differs in a number of respects from the term *band*, a concept that has been used in the Great Basin literature. The term *band* has typically been used in reference to a nomadic group without permanent, fixed residence, whereas people in these three districts lived in permanent villages for

most of the year. Bands have been portrayed as lacking political organization at any scale larger than the small individual band, whereas the districts in the southern Great Basin constituted sub-units within regional and national-level political organization with national-level political leadership. Finally, the term band has usually been used to refer to groups whose subsistence strategy does not include agriculture or horticulture, whereas horticulture was part of the precontact--and postcontact--strategy of the people in these three districts. Semiautonomous local groups of extended families and lineages settled along major watercourses and oases in a "rancherian" pattern of dispersed villages (Spicer 1962; Dobyns and Euler 1980) which seasonally gathered together for harvesting, hunting and ceremonial activities. Throughout the rest of the annual cycle, these localized units exploited a variety of ecozones outside of their core horticultural oasis areas (Stoffle and Evans 1978; Stoffle and Dobyns 1982, 1983; Stoffle, Dobyns and Evans 1983).

Each of these three districts encompassed a cluster of permanent settlements, closely linked by kinship. Each district also encompassed a territory that contained all or nearly all of the resources necessary for the survival of its population, including a cluster of reliable springs to support permanent settlements and horticulture, plant resources for use in manufacture, seedgrain harvesting territories, pinyon nut harvesting territories, and game harvesting territories. Each district, then, included both a core area of permanent settlements at a cluster or string of springs and an extensive hinterland area where resources were harvested. Each district had a district political leader, often called the "local chief". Often there was some linguistic variation from one district to the next; even between two neighboring Western Shoshone districts, for example, there might be minor but distinctive variations in speech, as there were between the Oasis Valley district and the White Rock Spring district (Stewart 1938:94; Stewart 1966:186).

The core areas or central places of the three districts discussed here are readily identified, and it was here that each district group had the most highly developed sense of territoriality and proprietorship. Outer boundaries cannot be as precisely delineated, for several reasons. In the remoter and higher elevation areas, one districts' harvesting territories often checkerboarded with the neighboring district, and some harvesting areas were apparently used jointly by neighboring district groups. Also whereas the ethnographic, historical, and archaeological record provide ample evidence about the location of the core residential areas of each

district, documentary and ethnographic information about the hinterlands of the districts is unsurprisingly much more sketchy. This report delineates approximate boundaries for the districts.

Local Use Area

The term *local use area* is used in this report to indicate a set of occupational and resource use sites that are closely linked together, both in terms of spatial relationship and in terms of their constituting part of an integrated pattern of use. When Oasis Valley people, for example, went to the Dune Wash area of Yucca Mountain to harvest wild plant and animals resources there, they occupied temporary camps (used year after year), and used a complex network of sites including water sources, hunting blinds, seed drying floors, roasting pits, grinding stones, and so on. From one or more temporary base camps, women would go to various plant food harvesting territories, then bring back seeds and nuts for processing at the base camp. Men would go out to various sites to hunt with nets and from hunting blinds.

American Indian people who visited the Yucca Mountain study area identified a series of local use areas by using knowledge from site visits, preexisting knowledge about the area, and cultural logic (See Chapter Two; Stoffle et al. 1990). These local use areas remain suggestive at this time, subject to further analysis by the Indian people. Like professional archaeologists, these Indian people tended to not move beyond available information when interpreting sites, occupational complex units, and the region. It should be noted that no Indian person spent more than two days in the study area. Therefore, the following interpretations primarily derive from a composite of American Indian interpretations. Tables 4.0 and 4.1 present site-specific overviews of archaeological features and plants interpreted by Native American representatives who visited the study area.

Ogwepi District (Oasis Valley District)

The district group known as the *Ogwe'pi* (creek) people had its residential core in the Oasis Valley (Steward 1938:93-94). The Amargosa River has its headwaters in Oasis Valley, fed by numerous large springs. The Amargosa River itself is an ephemeral stream; much of the river's

Table 4.0 NATIVE AMERICAN INTERPRETATIONS OF SITE FEATURES

FEATURES	SITES																				
	12	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
CEREMONIAL OR BURIAL FEATURES																					
rocking: burial				X				X			X				X						
rock outcrop: burial(s)		X									X							X			
rockshelter: burial(s)							X												X		
ceremonial site		X																			
sweathouse site								X													
pestle buried in stone												X									
cairn: mourning ceremony																					
rocks with drilled												X									
boles: musical stones																					
medicine rock																			X	X	
petroglyphs																					
HABITATION SITES																					
rockshelter: winter																					
habitation site																	X				
rockshelter: summer																	X				
habitation site																					
rockshelter: temporary																	X	X			
habitation site																					
rocking: temporary																					
habitation site																	X				
other camping site																					
pit: house foundation																					
fireplace																					
cooking pit																					
pit: cache																					
pottery shards																		X			
rockshelter: cache																			X		

FEATURES	SITES																				
	12	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
TRAILS AND WATER SOURCES																					
tinajas																					
rock: direction marker				X				X			X										
petroglyph: direction marker				X											X					X	
rocking: lookout					X	X	X														
rockshelter: lookout								X							X						
HUNTING-RELATED FEATURES																					
rocking: hunting blind					X	X															
game trail to water					X																
pit trap					X																
cache of deadfall triggers														X							
cluster of rock weights, tools															X						
lithic tool production site																X					
FOOD PROCESSING FEATURES																					
rocking: nut or seed processing site					X	X										X					
rockshelter: nut/seed processing site								X													
grinding stones																					
bundle of basket-weaving sticks																X	X	X	X	X	

FEATURES	SITES																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
ANIMALS																					
red-tail hawk																					
coyote				X	X																
chuckwalla				X	X																
deer				X	X																
wild burro				X	X																
mountain sheep																					
turtle																					
bird nest (hawk?)																					

ETHNOBOTANICAL SITE

[illegible]

PLANTS

ETHNOBOTANICAL SITE

	2	4	5	7a	7b	7c	7d	8a	8b	12	13	15	15a	17	19	20	24a	24b	24c	25	27a	27b	27c
<i>Thamnosma montana</i>										X													
<i>Thurpinodum integrifolium</i>										X													
<i>Yipha dumigena</i>										X													
<i>Yipha latifolia</i>										X					X					X			X
<i>Veronica angustifolia</i>										X					X					X			X
<i>Yipha eriantha</i>										X		X											
<i>Xylomiza longifolia</i>										X										X			X
<i>Yucca baccata</i>										X					X								
<i>Yucca brevifolia</i>										X					X								
<i>Yucca schottii</i>										X										X			

flow is underground and the aboveground portion exhibits wide fluctuations. Even though the river itself is ephemeral, the numerous large springs provide an abundance of water year round. Traditionally there were numerous Indian villages along the Oasis Valley, associated with many of the major springs (see Map 4). During the mining boom most of the large springs were tapped to power ore-processing mills and to supply the mining towns. underground, and the aboveground flow undergoes large seasonal variations. This was traditionally a Western Shoshone local district, one of dozens of local districts that together comprised the Western Shoshone national ethnic group. After contact there was increasing intermarriage of Paiutes and Shoshones in this district.

In the late 1800s the father of Tom Stuart, one of Julian Steward's Indian consultants, was the local chief of this district (Steward 1938:94). By the early 1900s Panamint Joe Stuart, a relative of the earlier local chief, had become the local Indian leader of the Oasis Valley area (*Bullfrog Miner* vol. 2, no. 26, August 31, p. 1, col. 2). Panamint Joe Stuart was born where the Beatty ranch was later located (*Bullfrog Miner* vol. 2, no. 24, Sept. 7, 1906, p. 3, col. 6). He was regarded as the leader of Indian people in the entire Oasis Valley area and often referred to as "Chief of the Shoshones" (*Bullfrog Miner* vol. 4, no. 12, June 13, 1908, p. 5, col. 3; Ritter 1982:14; Wier 1961:19; Steward 1938:95).

To the east the *Ogwe'pi* district extended to Fortymile Canyon; to the north it encompassed part or all of Pahute Mesa; to the west it encompassed at least the eastern slope of the Grapevine Mountains and the Funeral Mountains; to the south it encompassed Big Dune and the southern end of Yucca Mountain. This district encompassed all of Yucca Mountain. The *Ogwe'pi* people, who had their primary residences in Oasis Valley, were the principal users of the harvesting territories and the camps on Yucca Mountain, though visitors from neighboring districts were able to arrange to use the area on the basis of kinship ties and/or long-term ties of exchange. These reciprocal agreements to share harvesting areas with neighboring groups made it possible to compensate for unpredictable year-to-year variations in the yield of important species.

Oasis Valley Core Area

There were no site visits by Native American representatives in the Oasis Valley core area. However, historical and ethnographic sources and interviews conducted with Native American individuals by members of the

project team provide a great deal of information about this core area.

The Amargosa River is an ephemeral watercourse which flows through the Oasis Valley Core Area. It is fed by numerous major springs. Among these springs is a hot spring which has been operated as commercial venture for most of this century. For much of the year a stream flows through the Oasis Valley, supporting extensive meadows and marshes. Before Euroamerican settlement began, the Oasis Valley was dotted with a series of Native American villages located in proximity to many of the major springs. Native American people have continued to reside in Oasis Valley from contact through the present. In the late 1800s there were eight village sites along the Oasis Valley: *Ta:kanwa* at the hot springs, later Hicks Hot Springs; four villages near the mouth of Beatty Wash including one named *Sakainaga* and one named *Pa:navadu*; *Hu:nusu* further north; one near what was later the Howell Ranch; and one at Indian Camp, at the head of Oasis Valley (Steward 1938:94). M. M. Beatty, from whom the town of Beatty takes its name, married into the local Indian community; he and his wife raised several "mixed-blood" children (*Rhyolite Herald* vol. 4, no. 34, December 16, 1908, inside p. 1, col. 3; *Bullfrog Miner* vol. 4, no. 38, Dec. 19, p. 8, col. 5). One of Beatty's sons, M. M. Beatty Jr. reported that during his childhood in the late 1800s and early 1900s there were still several groups of Native American people (15 to 20 per group) who resided in the Oasis Valley for part of the year and spent other parts of the year harvesting wild food resources elsewhere (Beatty 1968).

Until 1906 a group of about 25 Indian people under the leadership of Panamint Joe Stuart lived in a village about ten miles north of Beatty, near the later site of Springdale (*Beatty Bullfrog Miner* vol. 1, no. 19, October 7, 1905, p. 2, col. 2; *Bullfrog Miner* vol. 2, no. 18, July 27, 1906, inside p. col. 1). During the mining boom decade after 1904, there were also Native American labor camps located at the northern edge of Beatty, the northern edge of Rhyolite, and on the outskirts of Bullfrog, and Rhyolite (*Rhyolite Daily Bulletin*, vol. 1, no. 294, December 26, 1908, p. 4, col. 1; see photos 1 through 4). The 1910 U.S. federal census listed 30 Native American persons in the Springdale Census Precinct and 10 in the Rhyolite Census Precinct, all of them identified as Shoshone (U. S. Department of Commerce 1913).

In the 1930s Indian people constituted a substantial minority of the population in the Oasis Valley. Of approximately 250 persons, some 75 or 90 were Native Americans; a 1937 B.I.A. study reported that there were

15 Native American families living in Beatty and another four families living at a ranch two miles up the valley; a portion of their aggregate income came from the sale of basketry and other crafts and from the commercial sale of pinyon nuts (U. S. Bureau of Indian Affairs 1937:4,6,7). There was still a Native American settlement at the north edge of Beatty until a flood destroyed the structures in the 1960s. Since that time, Indian people have lived in homes located throughout the Beatty area. Chapter Three provides a more detailed discussion of Native American ethnohistory in the Oasis Valley area since contact.

Yucca Wash Local Use Area

The Yucca Wash Local Use Area is located in a large valley that divides the main portion of Yucca Mountain from its smaller northern portion. The valley derived its name from a large and long dry wash that is the most dominant geological feature of the central portion of Yucca Wash Valley. Evidence of prehistoric and historic occupation and use is found throughout the Yucca Wash Valley (Pippin 1984). Different types of sites from various portions of the valley were selected for visits by the Indian people. Six sites (Sites #8 through #13; See Map 8) were visited. These include an open lithic scatter site, a rock quarry, a camping area near two large rock tanks, rockshelters, plant gathering areas, and a ceremonial site. Tables 4.2 and 4.3 summarize the features and plant resources interpreted by Native American representatives at the site comprising this local use area.

Yucca Wash Quarry Site (Site #8 - 26Ny1011). The Yucca Wash Quarry site was categorized as an extensive quarry and temporary camping site by DRI archaeologists. It has a large lithic scatter made up of numerous flakes, cores, and stone tool remnants. Some artifacts are as old as 8,000 years.

Features interpreted at this site included the quarry materials, a fireplace, plants and animal tracks. Indian representatives also provided an interpretation of how the site was used and noted that certain types of religious activities would normally occur near a major quarry site such as the one visited. The religious activities would have focused on explaining to the rock why it was being taken and the tasks to which it would be put.

The consensus among the Indian people who visited the site was that the area was a good short-term camping area because it provided good visual control over the surrounding territory. The site is without

Table 4.2. NATIVE AMERICAN INTERPRETATIONS OF FEATURES
IN THE YUCCA WASH LOCAL USE AREA

FEATURE	INTERPRETATIONS
rock ring (Sites #9 and #12)	potential burial
rock outcrop (Site #12)	temporary habitation
rockshelter (Sites #9, #10, #11)	potential burial
	temporary habitation
	lookout (#9)
pestle buried in stone cairn (Site #13)	nut/seed processing (#9)
site #8 and #9 (entire area)	mourning ceremony site
ring of stones (Site #8)	camping sites
ceramic shards (Site #11)	fireplace
tinajas (Sites #9 and #12)	pottery shards
lithic scatter (Sites #9 and #11)	water tanks
stones (Sites #9, #11 and #12)	tool production site
	grinding stones
deer (Site #9 and #13)	
mountain sheep (Sites #8, #9 and #11)	

Table 4.3. NATIVE AMERICAN PLANTS IN THE YUCCA VALLEY LOCAL USE AREA

SCIENTIFIC NAME	COMMON NAME
<i>Amelanchier utahensis</i>	Serviceberry
<i>Amsinckia tessellata</i>	Fiddleneck
<i>Artemisia tridentata</i>	Big sagebrush
<i>Atriplex confertifolia</i>	Shadscale
<i>Brodiaea pulchella</i>	Desert hyacinth
<i>Calochortus flexuosus</i>	Mariposa lily
<i>Castilleja chromosa</i>	Indian paintbrush
<i>Coleogyne ramosissima</i>	Blackbrush
<i>Delphinium parishii</i>	Larkspur
<i>Descurainia sophia</i>	Tansymustard
<i>Descurainia pinnata</i>	Tansymustard
<i>Encelia virginensis</i>	Brittlebush
<i>Eriogonum inflatum</i>	Desert trumpet
<i>Euphorbia albomarginata</i>	Spurge, rattlesnake weed
<i>Ephedra nevadensis</i>	Indian tea
<i>Ephedra viridis</i>	Indian tea
<i>Juniperus osteosperma</i>	Juniper
<i>Krameria parvifolia</i>	Range ratany
<i>Larrea tridentata</i>	Creosote bush
<i>Lycium andersonii</i>	Wolfberry
<i>Menodora spinescens</i>	Wolfberry
<i>Opuntia echinocarpa</i>	Golden cholla
<i>Oryzopsis hymenoides</i>	Indian ricegrass
<i>Purshia glandulosa</i>	Buckbrush
<i>Salvia columbariae</i>	Chia sage
<i>Stanleya pinnata</i>	Indian spinach
<i>Streptanthus cordatus</i>	Mustard
<i>Symphoricarpos longiflorus</i>	Snowberry
<i>Xylorhiza tortifolia</i>	Desert aster
<i>Yucca brevifolia</i>	Joshua tree

access to water and so it would not have been used to camp for longer periods.

Sever Tanks Site (Site #9 - 26Ny1964). The Sever Tanks site is located in a hidden small round valley at the head of Sever Wash. The location is also known as the Pink Tuff site because of a conspicuous, colorful pinnacle of pinkish rock. This hidden valley contained a variety of cultural features, including open area camping and processing stations, rockshelters, and at least two large *tinajas*. The *tinajas* were unique because of their size. DRI archaeologists who recorded the site estimated that these tanks have capacities that exceed 80 gallons each. Features interpreted by Indian people at this site included artifacts, a potential burial, and animals. During the ethnobotany visit, Native American plant specialists discussed the uses of 16 species of plants at this site (Stoffle, Evans, Halmo, Niles and O'Farrell 1988:113). These plants are included in Table 4.3.

The Indian people suggested that this site would have been a place where Indian people stayed for long periods of time. It has a good source of water due to the *tinajas*, protection from observation by the surrounding mountains, protection from the elements in the rockshelters, and its own sources of food in the plants that could be gathered in the valley.

Yellow Rockshelter Site (Site #10 - 26Ny4648). The Yellow Rockshelter site is located near the bottom of Yucca Wash on a small bench above where water would flow when the wash was active. It is composed of a few small rockshelters in a yellow-colored rock formation. There were very few artifacts found in the shelters, but there was a lithic scatter on the slope a few yards away.

The Indian people interpreted this site as being only casually used. Rock chips scattered along a nearby slope indicated that the site had been used for tool production and that the rockshelters could have been a place where activities occurred during harsh weather. Although not used on a more permanent basis, Indian representatives generally felt that it was associated with nearby sites like the Boulder Rockshelter.

Boulder Rockshelter Site (Site #11 - 26Ny4643). The Boulder Rockshelters site is located just north of the Yellow Rockshelter site. The site involves two large boulders located high on the southwest-facing flank of north Yucca Mountain at an elevation of about 4,700 feet. At the edge of each boulder is a rockshelter and, downslope from the boulders, an extensive lithic scatter. In addition, six grinding slabs were located in or

near the front of the rockshelters. These and other features of the site were interpreted by Indian representatives.

The site may have been used as a hunting camp. Three types of hunting camps were discussed. At Type One camps hunters would stay by themselves at high altitude camps while acquiring sufficient game to begin hide and flesh processing. Type Two camps would be located at lower elevations and occupied by women and other family members who would process hides and flesh while the hunters returned to higher elevation camps for additional animals. Type Two camps were used for additional and more extensive animal processing. Type Three camps were located at lower elevations near plant resources so that both animal and seed processing could occur at the same time.

Most of the Native Americans who visited the site felt that the location was too high for a seed and animal processing camp where people would have stayed for long periods of time and too low for a Type One hunting camp. One Southern Paiute elder interpreted the site as a mountain sheep hunting camp, which may have been used for weeks at a time, but not for longer periods. The presence of grinding stones indicated that women were present at the camp, thus causing it to be interpreted as a Type Two hunting camp. The women would have ground local fruits and seeds, such as Joshua tree and wolfberry, while the men would go off to hunt. A Southern Paiute woman noted that the elevation did not normally support stands of wolfberry (Southern Paiute *u'upi*). She believed, therefore, that the seeds had been brought to this site from another location and that women would have processed the seeds on the grinding stones. Representatives mentioned that the site could have been used in either the summer or the winter.

A Paiute woman raised the hypothesis that the rockshelters could have been used to store surplus food. After discussion with other persons, she decided against such a interpretation because of the elevation factor. Food storage would be most likely near to a Type Three camp because that would be where most of the processing would occur. The Type Two rather than Type One camp interpretation was further supported by stone flakes resembling unfinished arrow points as well as broken pieces of ceramic vessels. Type One camps tend not to have pottery, although tool production could have occurred at either type of camp.

Chia Gathering Site (Site #12 26NY4631). Near the head of Yucca Wash, where it widens and divides into a series of smaller washes, is the Chia Gathering site. The site was recorded by archaeologists as being

composed of stone materials scattered along the northeastern edge of a shallow wash. No features were recorded by the archaeologists at this site, but they had noted the presence of chia (*Salvia columbariae*). During the American Indian archaeology site visit no chia plants were observed, but an Owens Valley Paiute woman noted that the site contained abundant "strong medicine." During the spring ethnobotanical visit, however, the botanist collected a specimen of chia from the location (Stoffle, Evans and Halmo 1988).

Nine other plant species were identified by Native American plant experts at this site. These plants are included in Table 4.3. Steward's consultants indicated that Indian people based in the Oasis Valley area were among those who travelled to Yucca Mountain to harvest wild foods; they specifically mentioned harvesting *Salvia* on Yucca Mountain (Steward 1938:96).

Prow Pass Ceremonial Area: Pestle Site (Site #13 - 26Ny3053 - 26Ny3055). This area is composed of at least two functionally different sites but apparently related sites (1) the Pestle Site and (2) Petroglyph Cave Site. The area is located almost one mile west of the Chia Gathering area: Prow Pass is the major low-elevation area that separates the northern and southern portions of Yucca Mountain. It is an easily accessible pass that derives its name from a narrow, dramatically steep portion of Yucca Mountain that is called "the Prow" because it resembles the prow of a ship.

The site is associated with a 150-foot tall, freestanding rock formation on the eastern slope of Prow Pass, at an elevation of about 4,800 feet. Perhaps the most distinctive feature of this site was that of a stone pestle, cylindrical in shape and approximately 14 inches in length, placed in a rock cairn at the base of the highest point on the ridge. Indian representatives also interpreted possible burial rocks, rock rings, hollow rocks with openings, three small *tinajas*, grinding slabs and evidence of animal presence.

All of the Indian people who visited this site interpreted it as being a very religious place. The site potentially represents an area where people were buried. The stone pestle was interpreted to have been a ceremonially buried woman's tool that may be associated with a memorial mourning ceremony, such as those that are observed today by Western Shoshone and Southern Paiute people one year after a person's death. These ceremonies would have been conducted near the grave, not at the actual burial location. A Western Shoshone representative commented

that the site was very powerful and important. Two other Western Shoshone representatives refused to comment extensively on or even remain near the pestle site, perhaps due to the religious power said to be associated with it.

A Western Shoshone representative interpreted a burial site as being located next to a rock with a small hole in it that is associated with a series of flat rocks piled in front. This potential burial is located on the uphill slope from the pestle site toward the crest of Prow Pass. The representative said the arrangement of rocks resembled a traditional northern Shoshone burial because of the presence of the flat rocks.

Native American representatives also interpreted grinding slabs, rock rings, and the presence of *tinajas* as an potential temporary camping area. The spotting of a deer indicated that the area might also have been a good one for hunting. A number of rocks with holes in them on the northeastern slope near the rock rings were interpreted by a Western Shoshone representative as being musical stones. Similar stones were used by Indian people near Duckwater.

Indian plant experts identified three plants present in the Prow Pass Ceremonial Area (Stoffle, Evans, Halmo, Niles and O'Farrell 1988:110-111). During the second ethnobotany visit to this site, ethnographers discovered two pottery sherds (one of them a rim sherd) on the slope about ten feet below the pestle cache.

Prow Pass Ceremonial Area: Petroglyph Cave Site (Site #26NY3057 or 26NY3058). Plant specialists from Timbisha representing Western Shoshone people, Chemehuevi Southern Paiute from Chemehuevi Valley, California, and the Las Vegas Indian Center each visited the Petroglyph Cave Site during the ethnobotany portion of the study. During the second visit to this site, the Chemehuevi plant expert provided further interpretation of the petroglyphs at the entrance to the rockshelter. He began by pointing out what appeared to him to be snake and water signs, drawn from a mixture of charcoal and oil. He then noted that everywhere there was a natural hole or indentation in the rock, the indentations were painted. Some were blackened and some colored with red. Had these indentations been more square, he stated that they would have represented rain.

In the deeper, cave-like shelter, the Chemehuevi person noted two types of figures painted on the walls. The thicker, rounder figure may have represented a woman, while the stick figure may have represented a man. Three painted figures appeared to be holding hands, with a more

elaborate figure standing in front of them. These figures may have represented dancers and a medicine man, respectively.

The Chemehuevi person interpreted the site as being a possible camp for conducting religious ceremonies. It was noted that some of the cave markings may have had to do with the seasons or phases of the moon. He then related a story of the time when he was a boy, having to spend ten days alone up in a cave. He noted that "spiritual men" would go up into the hills for four days and fast until they had visions. Grandfathers would bring food, but it was eaten only after the others had had their visions.

On the east side of the rockshelter, ethnographers noted a large thicket of wolfberry (*Lycium* sp.) about eleven feet up toward the ridge. Returning to the truck at the end of the visit, ethnographers also noted a large lithic scatter, covering an area of approximately 27 feet, about 1,000 yards to the east of the site. Further along the way, a boulder with two rocks underneath of it were interpreted as a rock trap.

Summary. The archaeological features found in the Yucca Wash area, and the interpretations given by Native American representatives, suggest that this was a local use area that centered on plant harvesting, hunting activities and religious activities. The local use area involving people who remained in the area on both a seasonal and temporary basis. Potential burials identified by Indian people can be assumed to be the results of individuals who died while engaging in temporary or seasonal harvesting activities in the area rather than having been brought from another local use area.

Dune Wash Local Use Area

The Dune Wash Local Use Area begins on the eastern flank of Yucca Mountain at approximately a 4,000 foot elevation and drains for about four miles to the southeast until joining with Fortymile Wash at a 3,146 foot elevation. Three sites (#3 through #5) were visited in this local use area (see Map 8). Near its southeastern end, Dune Wash is constricted by the northern end of Busted Butte and the southern end of Fran Ridge. This constriction creates a natural hunting draw that served, according to the interpretations of Indian people who were present, as one of the major natural advantages of the valley. Three sites that make up part of this use area were visited by the Indian people. Tables 4.4 and 4.5 summarize the features and plant resources interpreted by Native

American representatives at the sites in this use area.

Dune Wash Rockshelter (Site #3 - 26Ny3042). The first site visited was one called Dune Wash Rockshelter. It is located at the southeast tip of Boundary Ridge where the ridge merges with the valley floor. In front of the rockshelter is a gentle slope extending to the wash, which appeared to be a working area. A few hundred yards away were two stone tanks or *tinajas* (Site #4), the only known water source in the area (Pippin 1984:184). About a quarter of a mile down the wash were a series of rock rings, named the Rock Ring Complex (Site #5), that are associated with the major constriction in the valley's shape. Native American representatives interpreted the site as a seasonal hunting and gathering site. The area also could have been an important seed-gathering area.

The site included a rock outcrop or low cliff along the end of the ridge. This feature was perceived by Western Shoshone, Southern Paiute, and Owens Valley Paiute representatives as a natural place for self-sealing burials. Whenever possible, burials were placed in low rock cliffs having steep eroding rocks above them, and less steep, non-eroding rock areas below. Such a burial location would continue to cover the body of the deceased as the rocks slowly eroded. Several pits at the site, some associated with large stones, were interpreted as having been used as deadfall traps for large animals whose pelts could be sold for cash.

A rockshelter located near the floor of the valley was interpreted as a good living site, suitable even as a winter camp, according to a Western Shoshone representative. A few hundred yards from the shelter are the *tinajas* described in Site #4, below. The DRI archaeologists were able to date a hearth found at this rockshelter and found that it had been used within this century (Pippin 1984). A grinding slab was also found. The site was interpreted by the Indian people to be a seasonal hunting and gathering camp and, perhaps, was used by persons traveling in a north-south direction. The Dune Wash occupational complex unit contains numerous plants and animals and could have been an important seed-gathering area. Animals, especially rabbits, could have been collectively driven down the valley and captured with large nets at the constriction. One Western Shoshone elder recalled participating in rabbit drives held in the Yucca Mountain area as a child. He said that rabbit drives were held by groups of people who normally did not live together throughout the year. They came together for the drive, hunted with a big net and

Table 4.4. NATIVE AMERICAN INTERPRETATIONS OF FEATURES
IN THE DUNE WASH LOCAL USE AREA

FEATURE	INTERPRETATIONS
rock ring (Site #5)	potential burial temporary habitation lookout hunting blind
rock outcrop (Site #3)	nut/seed processing potential burial ceremonial site
rockshelter (Site #3)	habitation, winter temporary habitation
rock ring (Site #3)	temporary habitation
rock ring (Site #4)	temporary habitation
pit (Site #5)	temporary habitation
tinajas (Site #4)	cache
rock (Site #4)	water tanks
trail (Site #4)	direction marker
pit (Site #3)	game trail to water
stones (Site #3)	trap grinding stones
coyote (Sites #3 and #4)	
chuckwalla (Site #3)	
deer (Sites #3 and #4)	
wild burro (Site #4)	

Table 4.5. NATIVE AMERICAN PLANTS IN THE
DUNE WASH LOCAL USE AREA

SCIENTIFIC NAME	COMMON NAME
<i>Atriplex confertifolia</i>	Shadscale
<i>Calochortus flexuosus</i>	Mariposa lily
<i>Delphinium parishii</i>	Larkspur
<i>Ephedra nevadensis</i>	Indian tea
<i>Eriogonum inflatum</i>	Desert trumpet
<i>Euphorbia albomarginata</i>	Rattlesnake weed; spurge
<i>Krameria</i> sp.	Range ratany
<i>Larrea tridentata</i>	Greasewood, creosote
<i>Lycium andersonii</i>	Wolfberry
<i>Lycium pallidum</i>	Wolfberry
<i>Menodora spinescens</i>	spiny menodora
<i>Mentzelia albicaulis</i>	Desert corsage
<i>Opuntia basilaris</i>	Beavertail cactus
<i>Oryzopsis hymenoides</i>	Indian ricegrass
<i>Streptanthella longiflorus</i>	Mustard

bows and arrows, and, afterwards, went their separate ways.

The gentle slope of the ridge joins with a short vertical cliff before it merges into the valley floor. Indian people noted that it provided a natural location for "self-sealing" burials. Whenever possible, burials were placed in low rock cliffs having steep eroding rocks above them, but on the steep, non-eroding areas below. Such a burial location would continue to cover the body of the deceased. Several Indian people mentioned that the location would have been ideal for burials. They noted that there were established locations, as well as places away from homes, where people were buried. The consensus among representatives was that the area was a potential burial site, but due to the self-sealing nature of the cliff erosion, no specific location was recorded.

Twin Tinajas Site (Site #4 - 26Ny3059). Located a few hundred yards to the north and west of the historic rockshelter is the Twin Tinajas site. These steep-sided natural rock basins hold rain water. The Western Shoshone term for such basins is *pooah*. Some *tinajas* in the desert are

known to have been artificially expanded in order to increase their capacity, while others were modified by adding rocks as covers, which reduced access to the water by thirsty animals and keep the water clean from blowing dirt and debris while also reducing evaporation. The two *tinajas* at Site #4 have rock covers.

In addition to the twin *tinajas*, features at Site #4 included a low rock wall or alignment that was built against the large *tinaja* base-stone, a variety of animal tracks and plant cover similar to that at the rockshelter site. The *tinaja* site, combined with the nearby rockshelter, was interpreted as a place suitable for spending the winter because it was a good hunting spot with available food plants. Shoshone people from the Kawich area came to this area for short hunting and gathering trips, according to a Western Shoshone representative. They also lived for extended periods at various sites in the Yucca Mountain area.

Local use area sites visited during the ethnobotany study included the Dune Wash Rockshelter and Twin Tinajas sites of the Dune Wash Local Use Area. During the first site visit, Native American representatives identified wolfberry, greasewood (creosote), Indian ricegrass and desert trumpet at the rockshelter site. Similar plant cover was noted at the Twin Tinajas site. During the ethnobotany site visit, Indian plant experts, ethnographers and botanists all noted a crescent-shaped or semi-circular arrangement of creosote bush just below the ridge or low rock wall alignment built against the *tinaja* base stone. The botanist noted that although creosote is very common and could well have grown spontaneously in such a pattern, the formation was somewhat unusual. This creosote formation resembled what could have served as a windbreak type structure. Such a tentative interpretation fits with the Indian interpretation of the site as a winter hunting/camping location. In addition to this botanical "feature," Native American plant experts identified a total of 11 plants at both sites (Stoffle, Evans, Halmo, Niles and O'Farrell 1988:102-103), four of which had been identified during the earlier site visits as well.

Rock Rings Site (Site #5 - 26Ny2960). About a mile down-wash from Sites #3 and #4 is the Dune Wash Rock Rings site. Features that were interpreted at this site included plants traditionally used by Indian people, a cache or storage pit, and a series of rock rings.

The location of the rock rings, on top of a ridge overlooking Dune Wash to the south and west and Fortymile Wash to the south and east, stimulated several comments about the use of the site for "keeping track"

of the whole southwestern portion of Yucca Mountain. According to the Indian people, it would have been a location for net traps used in rabbit or other small game drives. The rock rings themselves were variously interpreted as locations of sleeping circles, hunting blinds, look-out or ambush points, seed-processing floors for thrashing seeds or hulling pinyon nuts harvested at higher elevations.

Busted Butte Pass Rockshelters (26NY4753). The southern boundary of Dune Wash is formed by Yucca Mountain and Busted Butte. The two are divided by a low pass. Overlooking this pass from the Yucca Mountain side are a series of small rockshelters. One of rock shelters ranged from six feet to twelve feet tall inside. Near its opening stones were stacked, reducing the size of the opening. Inside the roof was smoke stained. This and the other rockshelters were interpreted by a Southern Paiute elder during the plant visit as being prime points of observation to protect others while they worked in the Dune Wash.

Above the rockshelters along the top of the ridge that leads to the northwest the Southern Paiute elder identified a series of stones associated with a human trail. The trail led into Dune Wash from the south. The elder suggested the stones were part of a trail marking system. One of the stones contained small holes that were interpreted as being made by Indian people. Interestingly, this trail led over the higher portion of the ridge and not through the lower pass between Yucca Mountain and Busted Butte.

Summary. The archaeological features found in the Dune Wash area, and the interpretations given by Native American representatives, suggest that this was a local use area that centered on plant harvesting and hunting activities involving people who came to the area on a seasonal or temporary basis and occupied temporary or seasonal camps while in the area. If there are burials in some of the locations identified by Native American representatives as likely sites, these can be assumed to be burials of individuals who died while engaging in temporary or seasonal harvesting activities in the area.

Crater Flat/Bare Mountain Local Use Area

This local use area is comprised of sites which include the western ridge of Yucca Mountain at the eastern boundary, the Crater Flat valley and associated Black Cone and Red Cone cinder cones in the center, and the eastern slope of Bare Mountain up to its crest, including Tarantula

Canyon and Specie Spring in the northeastern portion of the mountain. Native American representatives visited these sites during the ethnobotany portion of the study.

Tarantula Canyon/Specie Spring Site. This site is located in northeastern Bare Mountain, to the west-northwest of Crater Flat and Black Cone. Native American representatives visited two locations within this narrow canyon. The first stop was at the entrance to the canyon, the second further within the wash itself. Plants identified and discussed at this site are included in Table 4.6.

On the flat, bench-like terrace at the mouth of the canyon, ethnographers noted the presence of a fairly extensive lithic scatter, including a fractured arrow point. Plant specialists then identified and discussed traditional and contemporary use of *Stanleya pinnata*, a variety of Indian spinach which is boiled and eaten as greens. The Chemehuevi plant expert from the Colorado River Indian Tribes noted that pruning this plant by cutting the dried tops off of it caused the leaves to grow back thick the following year. She, along with Owens Valley Paiute plant experts, said the plant remained a current food plant with high value and that many Indian people continue to eat it.

Further into the wash, the plant expert from CRIT discussed the uses of chia sage, a small plant whose tiny gray seeds were harvested using a stick to beat the seed heads into a basket. The seeds were then boiled and eaten. All three plant experts discussed the uses of Indian ricegrass (*Oryzopsis hymenoides*), a seed food plant harvested in identical fashion to that of chia (see Chapter Five).

It was only during the second visit to this site that ethnographers and botanists realized the extent of a dense stand of Indian spinach. Accompanied by two Southern Paiute plant specialists from the Las Vegas Colony, the team began to roughly map out the boundaries of the stand. After the botanists had determined both the uppermost and lowest extent of *Stanleya* individuals at the boundaries, one person stood in each of the four "corners." Another person paced off each line to determine the dimensions of the stand in feet. Each pace equalled approximately one yard. The next step involved both ethnographers and botanists walking through the stand at approximately 15 yards apart, counting each *Stanleya* individual plainly visible above the shrub canopy. Proceeding from the uppermost portion of the stand down to its lowest extent, a total of 409 plants was counted. According to the botanist, it was unusual to find so many individual *Stanleya* plants in such a dense stand. It normally is

Table 4.6. NATIVE AMERICAN PLANTS
IN THE CRATER FLATS/BARE MOUNTAIN LOCAL USE AREA

SCIENTIFIC NAME	COMMON NAME
<i>Arabis pulchra</i>	Mustard
<i>Atriplex canescens</i>	4-winged saltbush
<i>Atriplex confertifolia</i>	Shadscale
<i>Brodiaea pulchella</i>	Desert hyacinth
<i>Castilleja chromosa</i>	Indian paintbrush
<i>Chrysothamnus nauseosus</i>	Rabbitbrush
<i>Coleogyne</i> sp.	Blackbrush
<i>Ephedra nevadensis</i>	Indian tea
<i>Ephedra viridis</i>	Indian tea
<i>Larrea tridentata</i>	Creosote bush
<i>Lycium andersonii</i>	Wolfberry
<i>Menodora spinescens</i>	Spiny menodora
<i>Nicotiana trigonophylla</i>	Indian tobacco
<i>Opuntia basilaris</i>	Beavertail cactus
<i>Purshia glandulosa</i>	Buckbrush
<i>Salvia columbariae</i>	Chia sage
<i>Stanleya pinnata</i>	Indian spinach
<i>Xylorhiza tortifolia</i>	Desert aster

widely scattered (Beatley 1976:169).

Once the boundaries of the stand had been mapped and measured, the Las Vegas Paiute plant experts began demonstrating a management technique used in maintaining stands of Indian spinach. This involved breaking off the tall, dry central stem or stalk at the base of the plant. In this way, the Paiute plant experts stated that fresh, green leaves in thick bunches would grow the following year. Las Vegas Paiutes demonstrated the technique earlier described by the Chemehuevi Paiute plant specialist. It is clear from the artifactual and botanical evidence that the Tarantula Canyon area afforded a suitable camping, tool processing, small game hunting and plant collecting area.

Additionally, during the second visit to this site, Las Vegas Paiute plant experts and the ethnographic team hiked up the wash leading to Specie Spring. Along the wash, one of the plant experts identified and discussed the uses of Indian tobacco (*Nicotiana trigonophylla*). All participants visited the spring site itself, where water flowed into a deep, pitcher-like natural rock basin worn smooth by the flow of water. Remains of animals just below the rock outcrop of the spring were found. No plant interviews were conducted at this site.

Black Cone Site. The Black Cone site, in the Crater Flat area, was visited by ethnographers and representatives from the Colorado River Indian Tribes and Bishop Indian Community during the ethnobotany on-site visit. The prominent feature of this site is the volcanic cinder cone that protrudes from the Crater Flat valley floor. Plants identified during the visit are included in Table 4.6.

Evidence from the on-site visit indicates that the site, particularly the large cinder cone, is a place of religious significance or power. As observed by one of the project ethnographers, an Owens Valley Paiute representative from Bishop left an offering of pine nuts and recited a prayer upon arriving at Black Cone. After walking over to a flat area of rock, and then sitting near another rock with a shallow depression, the representative began reciting a prayer as she placed the pine nuts on top of the rock. The ritual lasted about four minutes. When finished, she said she was going to leave the pine nuts for the "little mountain men" or any animals that might happen by. The ethnographer noted that she looked around in all four directions as she recited the prayer. Later, at the same spot, she and a Chemehuevi representative from the Colorado River Indian Tribes discussed and told parallel stories about "little people" or "little mountain men," who appear to people who were meant to see them, and apparently provide hunting success. The Owens Valley and Chemehuevi stories were remarkably similar to one told by a Timbisha Shoshone representative during the on-site visit to Prow Pass Ceremonial Area. At this same time, the Chemehuevi representative found a grinding stone placed at the base of the southeastern flank of Black Cone itself.

Despite the presence of abundant volcanic rubble, it seems likely that wild plant harvesting occurred to some extent. Herds of wild horses and burros continue to graze in the flats surrounding the cinder cone, as well as in the washes to the immediate south and southeast, on the outer eastern lip of the flat that comes off Black Cone. Although dry and sandy, the washes are relatively rich with plants. Berries, seeds, medicinal leaves and perhaps cactus fruit could be collected in these areas. It is possible, based on the evidence of observed offering and the presence of the grinding stone near the cinder cone, that some type of gathering and perhaps ritual processing and offerings of wild foodstuffs occurred at this site.

Yucca Ridge Site. This site, visited during the ethnobotanical on-site

visits, is located atop Yucca Mountain, along the south ridge road. It provides a panoramic vista of the Crater Flat valley, with the Black Cone and Red Cone cinder cones rising up from its floor to the west, with Bare Mountain further in the distance. Ethnographers and representatives from the Chemehuevi Tribe and the Las Vegas Indian Center found several grinding stones, along with rock-walled structures that may have served either as shelters or windbreaks and *tinajas* on the ridge just below the crest or top of the mountain. The site may very likely have served as a lookout point and food processing area. Table 4.6 includes the plants which were identified at this site.

Tohwahonupi (Snake Canyon, or Fortymile Canyon) Local Use Area

Tohwahonupi (or Fortymile Canyon) Local Use Area encompasses a part of the canyon where there is a deep-cut wash about twenty miles in length. The sides of the wash here are relatively steep, contrasting with portions of Fortymile Canyon to the north and south of this stretch, that lack these sharply-defined canyon sides. From the data provided by the Native American representatives, it appears that Fortymile Canyon can best be understood as a route of travel linking places and resources found at warmer and lower elevations to the south, such as Yucca Mountain and Ash Meadows, with places and resources found at cooler and higher elevations to the north, such as Pahute and Rainier mesas. Although it appears that many of the sites served Indian people who were traveling through the canyon on their way to different destinations, Fortymile Canyon itself was probably a destination point for other travelers who came to harvest resources in the vicinity of the canyon. Seven sites (#14 through #20) were visited in this local use area (see Maps 8 and 9).

Among the limited references to the Forty Mile Canyon area in newspapers published during the early 1900s, are mentions of Indian people using the canyon as a refuge area and route of travel. In about 1880 a prospector who entered Fortymile Canyon was attacked and driven away by Indian people after he had apparently succeeded in locating a spring identified to him by one of the 1849 emigrants as a landmark near some promising ore (*Carrara Obelisk* vol. 2, no. 1, May 8, 1914, p. 6, col. 3). In 1912 a Native American man took some rich ore to an assayer in Goldfield and was later trailed by a party of Euroamerican men who wanted to find out the source of the ore; they pursued him into Fortymile canyon, where he lost them (*Carrara Obelisk*, vol. 2, no. 1, May 3, 1914, inside p., col. 1.). One of the Native American representatives recalled a family from Ash Meadows that used to travel between Pahute Mesa and Ash Meadows using Fortymile Canyon as an access route.

Much of the Fortymile Canyon area has not been surveyed by DRI

archaeologists. The discussion in this report discusses only the eight sites visited by Native American representatives during the site visits. Features and plant resources of the sites which comprise this use area are summarized in Tables 4.7 and 4.8.

Stone Tool Processing Area (Site #14 - 26Ny955). On a flat terrace near the head of Fortymile Wash is an extensive lithic scatter referred to as Fortymile Lithic Scatter. Scattered over an area of an acre or more are flakes, mainly obsidian, visible every few feet. The site may have been used for processing stone tools from obsidian boulders found in Fortymile Wash.

Trigger Trap Bundle Site (Site #15 - 26Ny4722). Overlooking the confluence of Delirium Canyon and Fortymile Canyon is a south-facing rockshelter on a steep talus slope. The site is referred to as the Trigger Trap Bundle Site. The rockshelter contained two bundles of triggers used for deadfall traps, each bundle containing fifty to seventy-five triggers. Western Shoshone, Southern Paiute, and Owens Valley Paiute representatives were so impressed by the bundles that they discussed little else at this site. Two pottery shards and rocks used for pounding were also found in the shelter. Native American representatives were quite excited by the opportunity to examine these artifacts.

Twin Springs Site (Site #16 - 26Ny4664). About two miles north of the Trigger Trap Bundle Site is the Twin Springs Site, located near the confluence of Fortymile Canyon and Pah Canyon (*pah* meaning water and suggesting the presence of an important water source somewhere in this side canyon). Twin Springs is at roughly the midpoint of a journey from one end of the canyon to the other. The Twin Springs site was interpreted as an ideal camping spot for people using the canyon as a route of travel as well as for those staying in the canyon for longer periods to use its resources. The springs are located on a steep hillside, about 300 vertical feet above the canyon floor. Native American representatives believed that people would have camped in the canyon bottom, as well as in rockshelters on the opposite side of the canyon from the springs. A Western Shoshone elder interpreted the site as a trappers' camp used by Indian people in recent times. He also identified the site as a place where he stopped on the way to a one-year death ceremony that was held at White Rock Springs.

The Twin Springs site has been conceptually divided into two parts. "Division One" of the Twin Springs is a large flat sandy area just above the canyon floor. Division One includes a petroglyph boulder, a rock ring, Table 4, a cluster of rock weights, a lithic scatter, and a grinding slab.

Located on the slope below the springs is a petroglyph boulder. Southern Paiute, Owens Valley Paiute, and Mojave representatives identified the petroglyph boulder as a trail marker identifying the location of the springs. A Western Shoshone elder added that the petroglyph indicated the presence of a Water Baby--a spirit that lives at and owns

Artifacts included manos, grinding slabs, and pottery sherds. A bundle of sticks was found at the spring; these were identified as a part of the *sehoviam* plant which is used for basket weaving; the plant grows around the spring.

Twin Springs Rockshelters (Site # 17). On the opposite side of the canyon from Twin Springs, about three-fourths of a mile from the springs, are three rockshelters located at the ridgetop about 250 feet above the canyon floor.

Native American representatives interpreted the first rockshelter as having been a temporary camp used as a stopover by travelers, as a winter hunting camp, or as a base camp for pinyon nut harvesting. Within the rockshelter were rocks identified as a firepit, a mano, a grinding slab. An Owens Valley Paiute representative noted that the grinding slab bore marks indicating its ownership. The shelter also contained a rock wall which was identified as having been used to separate sleeping quarters. Downslope was another grinding slab and a mano.

Nearby was a jagged rock ring which Southern Paiute and Western Shoshone representatives interpreted as a possible marker of a burial site. Scattered pieces of pottery were located nearby. These were identified by Western Shoshone as similar to Western Shoshone pottery and were interpreted as associated with a burial. Pots belonging to a deceased person were often broken during the burial ceremony.

The second rockshelter at Twin Springs was interpreted as having been used as a summer shelter and/or as a winter shelter for storage of materials. Southern Paiute representatives noted a small stick protruding from an upper rock shelf in the shelter and identified it as having been used to hang a tarp to enclose the living space or to suspend food or to hold a mirror. A Western Shoshone representative identified a third rockshelter as a place to store food.

In the Fortymile Canyon Local Use Area, two sites were revisited during the ethnobotany on-site visit. The first was Fortymile Canyon itself, where Indian plant specialists identified seven species of plants (Stoffle, Evans, Halmo, Niles and O'Farrell 1988:112-113). The Twin Springs site was the second site visited in this use area. More specifically, both "divisions" of this site were visited. Although Native American plant specialists did not actually visit the springs, which are located on a steep slope 300 vertical feet from the canyon floor, during the ethnobotany on-site visit, they did hike part way up the slope comprising division two. A total of five plants were identified at this site (Stoffle, Evans, Halmo, Niles

and O'Farrell 1988:113). Moreover, a plant expert from the Las Vegas Paiute Tribe who reported observing devil's claw (*Proboscidea* sp.), a highly valued basketry and food plant, during the archaeology on-site visit reaffirmed that she had seen it downslope, but near, the springs during the ethnobotany visit. Botanists and ethnographers, however, did not observe this plant.

Yellow Rock Spring Site (Site #18). About two miles north of the Twin Springs site is the Yellow Rock Spring site. Numerous rockshelters are located in a yellow rock formation which begins about 75 vertical feet above the canyon floor and extends some 225 vertical feet. Most of the small rockshelters are lacking in man-made features. One rockshelter contained grinding slabs and a rock wall.

Native American representatives interpreted the site as a place for temporary use by people traveling through the area. A Western Shoshone elder identified a canyon just north of the site as a likely route up to pinyon pine harvesting areas on Shoshone Mountain. Traveling about 4.5 miles up the canyon, a person would climb 3,000 vertical feet into abundant stands of pinyon pine. The Yellow Rock Site may have been used as a base camp for processing pinyon nuts gathered at the higher elevation. A number of flint chips were noted on the sandy area below the rockshelters, but the full extent of the site could not be determined. One Indian person noted that it must have been a large camp.

Red Rockshelter Site (Site #19). About 3.5 miles north of the Yellow Rock Spring site is the Red Rockshelter site, which includes a large rockshelter located on the flank of the canyon about 75 vertical feet above the canyon floor. The rockshelter is large enough to accommodate a number of people and a sandy flat area in front would accommodate even more. Indian people regarded it as a good camping site and suggested that many small openings in the surrounding rock face were probably used for storage. Several grinding slabs, two manos, and several pieces of obsidian were found on the floor of the rockshelter. An Owens Valley Paiute representative identified one of the slabs as used for grinding meat. A porous volcanic rock was identified as used for grinding pine nuts. A Mojave elder said that the rockshelter might be a burial site.

Petroglyph Panel Site. About 4.5 miles north of the Yellow Rock site is the Petroglyph Panel site (Site #20). The site lacks water, shelter, and other resources that would make it attractive as a camp. The site includes numerous petroglyphs pecked into two free-standing vertical rocks. These were interpreted as mapping the area, its campsites and water sources;

as identifying who owned the area; and as symbols with great medicinal and spiritual power.

On a low ridge just above the petroglyph panels is a flat horizontal stone with a six inch cylindrical hole in its center, identified by Native American representatives as a "medicine rock." This rock is similar to medicine rocks at other locations where Southern Paiute and Western Shoshone peoples place offerings and seek spiritual power. Such rocks are rare because they contain special powers. Indian people travel hundreds of miles today in order to seek cures at these rocks.

Nearby is a small rockshelter. The rockshelter contained two grinding stones. This shelter was not perceived to be a camp as much as a place for processing materials related to ceremonies at the petroglyph pannel and the medicine rock.

The Native American representatives who visited the site interpreted it as a place for religious activities. Many of the Indian people believed the site was a place for assembling before groups went into Fortymile Canyon. One person from Owens Valley thought the site might be the petroglyph site her grandfather had told her was near the head of Snake (Fortymile) Canyon.

Summary. The archaeological features found in the Fortymile Canyon area, coupled with the interpretations given by Native American representatives and information from historical literature suggest that this local use area encompassed a diversity of uses. Some of the habitation sites seem to have been seasonal base camps used while harvesting resources in the Fortymile Canyon area. Other sites may have been stopover sites by persons using the canyon as a north-south travel corridor. Ash Meadows people would have used the route on their journeys north to harvest pinyon pine nuts on Shoshone Mountain and to participate as guests in the fall festival activities centering around White Rock Spring. The canyon was used as the route of stagecoach freight and mail lines for a few years in the late nineteenth century (Pippin and Zerga 1983:57). The Fortymile canyon area may have been a use area shared by the people of the three surrounding districts, as well as by travelers from more distant districts using the canyon as a travel corridor.

The location of the Petroglyph Panel and Medicine Rock, near the north end of Fortymile Canyon, suggest that the petroglyphs may have served not only as a guidemap for travel through the canyon and a statement of what group or groups claimed territoriality over the Fortymile Canyon region, but as an assembly point where groups

preparing to travel south through the canyon assembled to seek spiritual empowerment and to discuss the landmarks, water sources, and camping places along the route. The location of the Petroglyph Panel and Medicine Rock also suggest that the site may have marked the juncture of these three neighboring districts.

Eso District (White Rock Spring District)

The district group known as the *Eso* (little hill) people had its residential core in a series of springs and tanks stretching in an arc from Oak Spring Butte to the Tanks in the Falcon Canyon area, in addition to Tipipah Spring. These springs included Tub Spring, Oak Spring, White Rock Spring, Captain Jack Spring, and several important tanks (Steward 1938:93-98; see Map 4). This was traditionally a Western Shoshone district. The *Eso* people and the *Ogwe'pi* people (the White Rock Spring district group and the Oasis Valley district group) had very strong reciprocal ties involving intermarriage, resource exchange, and reciprocal hosting of annual fall festivals that alternated between the two districts. (Steward 1938:98-99).

To the north and west this district encompassed Ranier Mesa and all or most of the Belted Range; to the east and southeast it encompassed Yucca Flat and may have extended even further east; to the south it encompassed Tipipah Spring and extended to the Petroglyph Panel site. Yucca Flat was the site of major fall rabbit drives, involving guests from throughout the region of the Nevada Test Site in addition to the *Eso* people (Steward 1938:97). Ranier Mesa, just east of these springs, has prime stands of pinyon pines. This arc of springs that includes White Rock Spring is thus centrally situated at the edge of a prime pinyon nut harvesting area and at the edge of a prime rabbit harvesting area.

Tosatumbipah (White Rock Spring) Local Use Area

The *Tosatumbipah* (White Rock Spring) Local Use Area was an important center of Indian population in southern Nevada at least until the late 1800s. There was a string of small villages at intervals of a few miles apart. The total population of these settlements as of about 1875 or 1880 was around forty (Steward 1938:94), and this was after many decades of declining Native American population in the Great Basin, due to disease. The White Rock Spring local use area was the residential core of

the *Eso* district. The local chief for the *Eso* district lived at White Rock Spring (Steward 1938:95). In the late 1800s settlements in the core area of springs included *Kuikun* at Captain Jack Spring; *Tunava* at White Rock Spring; *Wiva* at Oak Spring; *Wuniakuda* some five miles west of Captain Jack Spring and three miles east Ammonia Tanks; *Mutsi* and *Sivahwa* located at other tanks in the area; and *Tupipa* at Tippih Springs (Steward 1938:94-95). There were sweathouses at White Rock Spring and at Oak Spring (Steward 1938:98).

The *Tosatumbipah* Local Use Area was the staging point for major fall rabbit drives involving not only people from the *Eso* district but from the *Ogwe'pi* (Oasis Valley) district and guests from Ash Meadows, Lida and Death Valley (Steward 1938:97). It was also the locus for a major fall festival, held in association with fall harvesting activities including the fall rabbit drives and pinyon pine nut harvesting. At this festival, people of the *Eso* district hosted people from the *Ogwe'pi* district (Steward 1938:98-99). Fall festivals were rotated between Oasis Valley and the White Rock Spring Use Area, with these districts hosting each other in alternate years (Steward 1938:98-99). The attraction of the site as a center for annual regional events was the presence of numerous springs, the immediate access to Yucca Flats for rabbit harvesting, the proximity to pinyon pine harvesting areas immediately to the west on Rainier Mesa, as well as to areas for seed grain harvesting. At least during the late 1800s the small village of *Wuniakuda*, some five miles west of Captain Jack Spring, was the staging area for fall festival activities, and events were under the overall direction of the local chief of the *Eso* people, a man named *Wangagwana* who lived at Whiterock Spring (Steward 1938:98). Some of the guests at the fall festival and fall harvesting activities came from Ash Meadows (Steward 1939:97) and would have travelled through Fortymile Canyon.

Native American families and individuals continued to use White Rock Spring and other sites in the area, some as long-term residents, some on a temporary or seasonal basis through at least the 1930s. Tribal representatives visited Captain Jack Spring, White Rock Spring and Tippih Spring (see Map 10). Tables 4.9 and 4.10 list the features and plant resources interpreted in this use area.

White Rock Spring Site (Site #21 - 26Ny9). White Rock Spring is located about 15 miles northeast of the Petroglyph Panel site and about 5 miles northeast of Captain Jack Spring. White Rock Spring is a few miles east of Rainier Mesa. American Indian consultants identify this site

as a focus for many events they remember, including permanent residence of persons at or near the springs, periods of seasonal gathering, hunting and trapping using the springs as a base or centerpoint, and ceremonial events including a memorial ceremony.

Steward's Native American consultants indicated that there was a settlement called *Tunava* at White Rock Springs in the late nineteenth century, and that the chief of this general region lived at White Rock Spring (Steward 1938:95). Steward's Indian consultants reported that White Rock Spring was the staging point for major fall rabbit drives held under the direction of the local chief, *Wangagwana* (who lived at White Rock Spring); the annual rabbit drives at White Rock Spring lasted about a month and involved not only people who lived at the nearby springs but also families from Oasis Valley, Ash Meadows, Death Valley, and Lida (Steward 1938:97).

Native American people occupied the area around White Rock Spring at least through the 1930s. A Western Shoshone elder who visited the site reported that he had resided at White Rock Spring and that the body and chassis of a 1928 Buick still visible at the site was abandoned there while he and a friend occupied the stone cabin that still stands at White Rock Spring. Another Western Shoshone elder who was interviewed for the ethnohistory report indicated that his paternal relatives continued to winter at White Rock Spring into the 1930s and to hunt and trap in the vicinity.

The White Rock Spring site component of the local use area named for it was also revisited during the ethnobotany study. Native American plant specialists identified 12 species of plants available in plentiful supply at the spring near the cabin where one of the Duckwater representatives, who participated in the first site visit, once lived. These plants are included in Table 4.10.

Table 4.9. NATIVE AMERICAN INTERPRETATIONS OF FEATURES IN THE WHITE ROCK SPRING LOCAL USE AREA

FEATURE	INTERPRETATIONS
entire site area (#21)	regional hunting-gathering-processing area semi-permanent habitation
cabin	semi-permanent residence
car	owned by Indian person

Captain Jack Spring Site. About 10 miles northeast from the Petroglyph Panel Site is Captain Jack Spring, located in a narrow canyon in a pinyon pine forest. There are several Indian habitation sites in the area around the spring. The main habitation site is a rockshelter located about one third of a mile from the spring. The shelter contained aboriginal and historical artifacts and a pictograph (Reno and Pippin 1985:99). Artifacts collected from these sites during the 1960s included grinding stones, lithic tools, and industrial goods: pots, pans, enamelware, canteens (Worman 1969:40). Reno and Pippin note that there is "ethnographic information that it [Captain Jack Spring] was occupied for a fairly long time in historic times" (Reno and Pippin 1985:112).

Steward's Indian consultants stated that there was a habitation site known as *Kuikun* near Captain Jack Spring, where "one-eyed" Captain Jack lived with his wife in the late 1800s (Steward 1938:95). Captain Jack's wife apparently died in Beatty, in 1906 (*Beatty Bullfrog Miner* vol. 2, no. 37, Dec. 1, 1906, p.12, col 2); he must have remarried, for there is another report that his wife died in Beatty in 1931 (Woodward 1948). A survey team which included the chief engineer of the Nevada State Highway Department, the curator of the Los Angeles County Museum, a National Park Service naturalist, and a local guide, visited and reported on the rockshelter in 1948. The guide, Rosco (Death Valley Curly) Wright had first visited the rockshelter in 1931, three years after Captain Jack reportedly died there; at that time Wright observed an array of metal goods stored in crevices of the cave, in addition to stone tools (Woodward

Table 4.10. NATIVE AMERICAN PLANTS IN THE
WHITE ROCK SPRING LOCAL USE AREA

SCIENTIFIC NAME	COMMON NAME
<i>Amsinckia tessellata</i>	Fiddleneck
<i>Artemisia ludoviciana</i>	Watersage
<i>Artemisia tridentata</i>	Big sagebrush
<i>Atriplex canescens</i>	4-winged saltbush
<i>Castilleja chromosa</i>	Indian paintbrush
<i>Chrysothamnus nauseosus</i>	Rabbitbrush
<i>Coleogyne ramosissima</i>	Blackbrush
<i>Coryphantha vivipara</i>	Cactus
<i>Encelia virginensis</i>	Brittlebush
<i>Ephedra nevadensis</i>	Indian tea
<i>Ephedra viridis</i>	Indian tea
<i>Eriogonum sp.</i>	Desert trumpet
<i>Geastrum sp.</i>	Earthstar
<i>Gutierrezia microcephala</i>	Matchweed
<i>Juncus mexicanus</i>	Wiregrass
<i>Juniperus osteosperma</i>	Juniper
<i>Lichen</i>	Lichen
<i>Lycium andersonii</i>	Wolfberry
<i>Lycium pallidum</i>	Wolfberry
<i>Menodora spinescens</i>	Spiny menodora
<i>Opuntia echinocarpa</i>	Golden cholla cactus
<i>Opuntia erinacea</i>	Mojave prickly pear
<i>Oryzopsis hymenoides</i>	Indian ricegrass
<i>Peraphyllum ramosissimum</i>	Squawapple
<i>Pinus monophylla</i>	Pinyon pine
<i>Purshia glandulosa</i>	Buckbrush
<i>Quercus gambelii</i>	Scrub oak
<i>Rhus trilobata</i>	Squawbush
<i>Rumex crispus</i>	Curly dock
<i>Salix exigua</i>	Willow
<i>Salvia doriai</i>	Purple sage, Indian tobacco
<i>Sphaeralcea ambigua</i>	Globe mallow
<i>Symphoricarpos longiflorus</i>	Snowberry
<i>Typha domingensis</i>	Cattail
<i>Typha latifolia</i>	Cattail
<i>Veronica anagallis</i>	Speedwell
<i>Yucca baccata</i>	Yucca
<i>Yucca brevifolia</i>	Joshua tree

1948). When the survey team visited the rockshelter in 1948 they observed a variety of rusted metal goods, several grinding stones, an arrowhead, a "hammered brass bracelet of the type popular with Indian women during the 1850s and 1860s", and a ruined brush shelter in front of the rockshelter (Woodward 1948). Captain Jack reportedly inhabited the rockshelter at various times in the late 19th and early 20th century and reportedly died there in 1928 (Woodward 1948). Captain Jack was apparently a Paiute. He allegedly raided an emigrant train with some followers while he was based at Captain Jack Spring, fled to Mexico, and many years later returned to live at the rockshelter in his last years. (Woodward 1948). During the first on-site visit, one Western Shoshone elder stated that he had known Captain Jack. He, along with the elder's uncle, were well acquainted with the nearby Indian trails and preferred foot travel, in the form of running, to riding horses.

Captain Jack Spring was revisited by Native American plant experts during the ethnobotany study. Although no plants were collected at this site, botanists observed and recorded several species of plants which Native American experts identified at other sites. These species are included in Table 4.10.

Tippipah Spring Site. This site is located at the north base of Shoshone Mountain. Like Cane Spring, this site supports many species of spring-associated plants which Native American people used for food, medicine and manufacture. Plant specialists, representing Owens Valley Paiute people from Lone Pine, Western Shoshone people from Yomba, and Southern Paiute people from Kaibab and the Paiute Indian Tribe of Utah, identified 13 species of plants at this site (see Table 4.10), as well as two additional species at the Tippipah Highway Site, a lower bajada site in west Yucca Flat, about three miles north of its junction with the Mercury Highway.

During the first on-site visit, a Western Shoshone elder stated that his uncle had a garden of corn, squash and melons at Tippipah Spring at one time. He mentioned that Indian people planted crops wherever they lived near water, although gardens were located some distance away from the actual water source, presumably out of respect for animals. He further stated that they would pot irrigate their garden crops by carrying five-gallon buckets of water to them. Archaeological remains of Indian campsites surround the spring up to a distance of half a mile (Worman 1969:11).

Rainier Mesa Site. Rainier Mesa is prime pinyon pine habitat and was a major harvesting area for pinyon pine nuts. Archaeological surveys covering some 6% of the Pahute and Rainier Mesa area have identified hundreds of archaeological sites, most of them suggestive of temporary use of the area for harvesting wild plants and game. Sites include: windbreaks, conical lodges, rockshelters, cleared areas, rock rings, pinyon caches, roasting ovens, hunting blinds, rock ring habitation areas, and lithic tool manufacture sites (Reno and Pippin 1985:71ff). These have commonly been interpreted as prehistoric sites, but harvesting activities continued in historic times.

Rodgers Rockshelter and Rainier Rockshelter, located 200 feet apart on the south slope of Rainier Mesa, were excavated in 1962. Both contained evidence of Indian occupancy. Rodgers Rockshelter contained charcoal, pinyon nut shells, fragments of obsidian and chalcedony, sherds of Southern Paiute brownware, abalone shell pendants, and two types of glass trade beads (Worman 1963). In 1964 a burial was excavated in the Rainier Mesa/Pahute Mesa area; a skull was removed, with associated buckskin and basketry fragments, and the burial contained over 1300 glass beads (*Nevada Test Site News* vol. VII, no. 21, October 30, 1964, pp. 1,4,5,8; see Map 12).

Southern Paiute plant specialists visited the Rainier Mesa-top Site during the ethnobotany on-site visits. There they identified and discussed the uses of four species of plants. In addition, botanists recorded six species which Native American plant experts identified at other sites. All of these plants are included in Table 4.10.

Ash Meadows District

The Ash Meadows district was traditionally a Southern Paiute district. After contact there was a great deal of intermarrying of Shoshones into this district, and the villages of Ash Meadows became mixed Southern Paiute/Western Shoshone villages.

Ash Meadow's numerous large springs comprised the residential core of this district (see Map 4). To the west, the Ash Meadows District extended to at least the eastern slope of the Black Mountains and the southern part of the Furnace Range. In the northwest the district extended to Big Dune and the southern end of Yucca Mountain. Apparently part of Fortymile Canyon was either part of the Ash Meadows district or was an area held and used jointly by the *Ogwe'pi* people and the Ash Meadows

people. The Ash Meadows district encompassed Cane Springs and extended north to encompass at least part of Shoshone Mountain. The broken hills separating Ash Meadows from Pahrump Valley may have marked the southeasterly margin of the Ash Meadows District or Ash Meadows and Pahrump Valley may have comprised a single district in terms of their political leadership. The people of the Ash Meadows district had very close ties with the people of Pahrump Valley. Ash Meadows Charley is sometimes referred to as a leader in the Ash Meadows area (Coolidge 1937:63-66). In the late 1800s and early 1900s the people of Ash Meadows regarded Chief Tekopa as their regional leader (Steward 1938:185).

Ash Meadows Core Local Use Area

Ash Meadows people practiced "true horticulture" in "pre-Caucasian times" cultivating maize, squash, beans, and sunflowers which they irrigated using the abundant springs of the area (Steward 1941:231-232). Even after many of the better springs had been appropriated by Euroamericans--by the late 1800s--Native American people retained control of some springs in Ash Meadows and continued to farm independently. During the Bullfrog mining boom, Native American farmers in Ash Meadows sent produce to market in the Oasis Valley towns--Rhyolite, Bullfrog, and Beatty (*Rhyolite Herald* vol. 6, no. 17, August 20, 1910, p. 1, col. 6; *Beatty Bullfrog Miner* vol. 1, no. 44, February 3, 1906, p. 3, col. 4). In 1871 there was reportedly a population of some 31 Native Americans living in Ash Meadows under the leadership of Chief *Nu-a'-nung* (Powell and Ingalls 1976:12) at a time when Euroamericans had only begun to settle in the area.

Ash Meadows was an area of persistent resistance to Euroamerican encroachment, well into the twentieth century. Prospector Jacob Breyfogle was assaulted in 1864, but survived (*Beatty Bullfrog Miner* vol. 1, no. 15, July 1, 1905, p. 5, col. 1). In 1876 when a party of Europeans led by Joseph Yount pastured a large herd of livestock in the area of Johnnie, an Indian man later known as "Hos Killum" reportedly selectively killed all of the work horses (those with collar marks) in an attempt to prevent the establishment of a Euroamerican ranch in the area (Brooks 1970:10-11,39; Doherty 1974:166-167). Several prospectors were killed in the area around the turn of the century, with an Ash Meadows Native American man suspected as responsible for several of these deaths (*Goldfield Review*

vol. 1, no. 38, July 13, 1905, p. 6, col. 2).

In 1905 an Indian man in Ash Meadows killed several Indian people, including his wife and brother (*Goldfield Review* vol. 1, no. 38, July 13, 1905, p. 6, col. 2; *Carson City News* vol. 9, no. 205, August 31, 1910, p. 1, col. 1; Zanjani 1988:113-119). The 1910 census enumerated 54 Native American people in the "Johnnie Precinct District", evidently encompassing both Ash Meadows and Pahrump. Some of those enumerated clearly lived in Ash Meadows, including Charlie Meadows and his family, Dan Meadows and his family, Albert Howells and his wife, and Mary Scott. Of those clearly associated with Ash Meadows (partly on the basis of later ethnographic studies) ethnic affiliation is weighted toward Southern Paiute, with some intermixing and intermarrying of Western Shoshones (U. S. Department of Commerce 1913). In the period 1917-1920 several Native American people in Ash Meadows were involved bureaucratic and legal efforts to clarify and protect their rights to springs against Euroamerican encroachment (Creel, *Lorenzo D. Creel Correspondence File*) and a court decision upheld their rights to water at least one of the contested springs (U. S. Bureau of Indian Affairs 1937:10). As of 1937 there were four Native American families--roughly 16 individuals -- living at a spring in Ash Meadows; nearly one-fourth of their cash income came from the sale of wild foods in addition to small amounts of income from horticulture and from the sale of traditional crafts (U. S. Bureau of Indian Affairs 1937:10,16-17). Southern Paiute plant specialists have reported that they had relatives living in Ash Meadows through the 1950s. Table 4.11 lists the plant resources interpreted in the Ash Meadows core area.

Three sites in the Ash Meadows Core Area were visited during the ethnobotany on-site visits. Plant specialists representing the Owens Valley Paiute from Fort Independence and Southern Paiutes from the Moapa, Pahrump and Las Vegas tribes visited the sites of Point of Rocks Springs, Big Spring and Collins Spring. Each of the three sites were generally similar in plant cover, and Native American plant experts identified and discussed several important species (see Table 4.11). The area at and below the Point of Rocks Springs has been greatly altered in recent years, with the waters being impounded in several small reservoirs that are surrounded by dense vegetation. Big Spring consists of a cauldron-type spring on the eastern end of Ash Meadows, with the surrounding area dominated by saltgrass. Collins Spring, in the northeast part of the area,

Table 4.11. NATIVE AMERICAN PLANTS IN THE
ASH MEADOWS CORE AREA,ASH MEADOWS LOCAL USE AREA

SCIENTIFIC NAME	COMMON NAME
<i>Anemopsis californica</i>	Yerba mansa
<i>Atriplex canescens</i>	4-winged saltbush
<i>Atriplex confertifolia</i>	Shadscale
<i>Cirsium mohavense</i>	Thistle
<i>Distichlis spicata</i>	Saltgrass
<i>Echinocactus polycephalus</i>	barrel cactus
<i>Echinocereus engelmannii</i>	hedgehog cactus
<i>Encelia virginensis</i>	brittlebush
<i>Juncus mexicanus</i>	Wiregrass
<i>Krameria parvifolia</i>	Range ratany
<i>Opuntia basilaris</i>	Beavertail cactus
<i>Phragmites australis</i>	Cane
<i>Prosopis glandulosa</i>	Mesquite
<i>Prosopis pubescens</i>	Screwbean
<i>Salix exigua</i>	Willow
<i>Stanleya pinnata</i>	Indian spinach
<i>Stephanomeria</i> sp.	"Gum bush"
<i>Suaeda torreyana</i>	Seepweed
<i>Tessaria sericeae</i>	Arrowweed
<i>Thelypodium integrifolium</i>	Wild cabbage
<i>Typha domingensis</i>	Cattail
<i>Vitis arizonica</i>	Wild grape
<i>Rumex crispus</i>	Curly dock

consists of several seeps, perennially moist soils and dense stands of vegetation.

Representatives from Pahrump recalled that their relatives and friends lived at one time at Ash Meadows. One person's father lived near Devil's Hole at the northern end of the area. Another person stated that the Collins Spring site was the house site of another Southern Paiute person. Devil's Hole is a place rich in folklore regarding water babies and divers who went into the deep narrow basin, described as bottomless, never to return. One story tells of an Indian man entering Devil's Hole and emerging somewhere in southern California.

The entire Ash Meadows core area was an important habitation site for Western Shoshone and Southern Paiute people. It continues to be a very significant and sensitive area for Southern Paiutes, in that historic cemeteries are located in the general area which contain the remains of both historically significant individuals as well as close relatives. Plant specialists from Pahrump reacted with near shock upon observing what had once been the houseplots of their relatives and neighbors. They commented on how dry the area had become as opposed to the wet, green garden-filled marshland oasis it had once been. One person also commented on the intrusion of ranchers, who burned the houses and belongings of Paiute residents in their takeover of the area. These events remain vivid in the memories of Pahrump Paiute people.

Skull Mountain Local Use Area

Cane Spring Site. The Cane Spring Site lies at the base of the north slope of Skull Mountain. Vegetation at the spring site is dominated by four groupings of large willows (*Salix gooddingii*). Other plants include a majority of ubiquitous spring-associated vegetation.

Native American plant specialists representing the Owens Valley Paiute people from Fort Independence and Southern Paiute people from Pahrump and Moapa identified a total of 18 species of plants at this site, which are included in Table 4.12 (see also Chapter Five). Additionally, representatives discussed the presence of lithic material which was scattered downslope from the spring, as well as a grinding stone found inside of the dilapidated cabin and a series of rock rings and depressions to the west of the cabin.

Indian people were practicing traditional maize and squash horticulture at Cane Spring when the first Euroamericans visited the spring. One of the parties of emigrants that traversed the Nevada Test Site in 1849 stayed at Cane Spring for ten days. Manly and Rogers, serving as scouts, first stumbled upon the Indian rancheria at the spring. One of the Indian people offered a small amount of corn to the travelers in a gesture of goodwill. The Indian residents then fled in fear when the scouts departed in order to guide the main party to the spring. The Euroamericans noted cornfields that had already been harvested and found a cache of squash, which they consumed during their ten-day stay at the springs (Manly 1927:151,153,157; Belden 1954:64; Johnson and Johnson 1987:59). After leaving the springs and travelling westward for

Table 4.12. NATIVE AMERICAN PLANTS IN THE SKULL MOUNT
LOCAL USE AREA

SCIENTIFIC NAME	COMMON NAME
<i>Amsinckia tessellata</i>	Fiddleneck
<i>Atriplex canescens</i>	4-winged saltbush
<i>Atriplex confertifolia</i>	Shadscale
<i>Coleogyne</i> sp.	Blackbrush
<i>Echinocactus polycephalus</i>	Barrel cactus
<i>Echinocereus engelmannii</i>	Hedgehog cactus
<i>Encelia virginensis</i>	Brittlebush
<i>Ephedra nevadensis</i>	Indian tea
<i>Eriogonum inflatum</i>	Desert trumpet
<i>Euphorbia albomarginata</i>	Rattlesnake weed; spurge
<i>Gutierrezia microcephala</i>	Matchweed
<i>Juncus mexicanus</i>	Wiregrass
<i>Krameria parvifolia</i>	Range Ratany
<i>Larrea tridentata</i>	Greasewood, creosote
<i>Lycium andersonii</i>	Wolfberry
<i>Lycium pallidum</i>	Wolfberry
<i>Opuntia basilaris</i>	Beavertail cactus
<i>Oryzopsis hymenoides</i>	Indian ricegrass
<i>Phragmites australis</i>	Cane
<i>Prosopis glandulosa</i>	Mesquite
<i>Rumex crispus</i>	Curly dock
<i>Salix gooddingii</i>	Willow
<i>Sphaeralcea ambigua</i>	Globe mallow
<i>Stanleya pinnata</i>	Indian spinach
<i>Stipa speciosa</i>	Bunchgrass
<i>Thamnosia montana</i>	Turpentine bush
<i>Typha domingensis</i>	Cattail
<i>Veronica anagallis</i>	Speedwell
<i>Xylorhiza tortifolia</i>	Desert aster
<i>Yucca baccata</i>	Banana yucca
<i>Yucca brevifolia</i>	Joshua tree
<i>Yucca schidigera</i>	Mojave yucca

two days, Indian people shot several of the emigrants' livestock. Rogers, one of the party, later reflected that "I suppose the Indians shot our cattle out of revenge for eating their squashes" (Belden 1954:64).

There are archaeological remains of Indian campgrounds on the hilltops and hillsides to the northeast, east, and west of the spring (Worman 1969:12). There is an Indian burial site located some 100 feet from the pond. Even after vandals had dug up the site, systematic excavation yielded 62 glass trade beads of several different kinds (Worman 1969:14-15). Sherds of pottery are abundant both on and below the surface, as are lithic materials, with tool types reflecting a long time span of occupancy (Worman 1969:14).

In the late 1800s Cane Spring was used as a stage-stop on a freight route between Utah and southern California; in 1928 water was piped from Cane Spring to the shortlived mining camp of Wahmonie (Worman 1969:12).

Frenchman Flat Site. This site lies at the northeastern base of Mt. Salyer, three miles south of the Cane Spring-Mercury Highway junction. Ethnographers, botanists and Native American plant specialists briefly visited the site. Only two plants were identified at this site, although botanists recorded the presence of four additional Indian plants which had been identified elsewhere. This valley may have been utilized for harvesting food and medicinal plants much like the Rock Valley area.

Rock Valley-Jackass Flats Divide Site. This site is composed of a mixed shrub community at the northeastern base of Little Skull Mountain. Native American plant specialists identified ten species of food and medicinal plants at this site. These plants are included in Table 4.12. Despite the lack of archaeological remains, the site may have been used to harvest a variety of food and medicinal plants.

Conclusion

This chapter draws upon the interpretations of cultural resources offered by Native American representatives during archaeological and ethnobotanical site visits, as well as historical, ethnographic, archaeological, and oral history sources in order to develop a spatial analysis of Native American patterns of use in the Yucca Mountain area. By triangulating between three different sources of data--indigenous knowledge and oral history, ethnohistorical and ethnographic documents, and archaeology data and interpretations--it has been possible to arrive at

a better understanding of Native American use patterns than by using any one of the sources alone.

Drawing on these three kinds of data, this chapter has developed a discussion of resources in the Yucca Mountain area in terms of local use areas within which a number of sites are related by their proximity and by their forming part of a coherent pattern of use. These local use areas vary in their characteristics. One of the local use areas discussed was a core population area with numerous village sites. In most of the local use areas discussed here most of the sites were apparently occupied on a seasonal or temporary basis while hunting or harvesting plant resources and may have included small scattered sites occupied on a more permanent basis.

Using the same procedure of triangulating from three kinds of data, this chapter has also developed a discussion of more inclusive spatial units. The data has suggested that three neighboring districts converged near Yucca Mountain, each district encompassing a number of local use areas. Each district included a core area of clustered villages and hinterland areas for resource harvesting. Each district encompassed virtually all of the resources needed for the survival of its residents from year to year. Each district was semiautonomous, having its own political leadership.

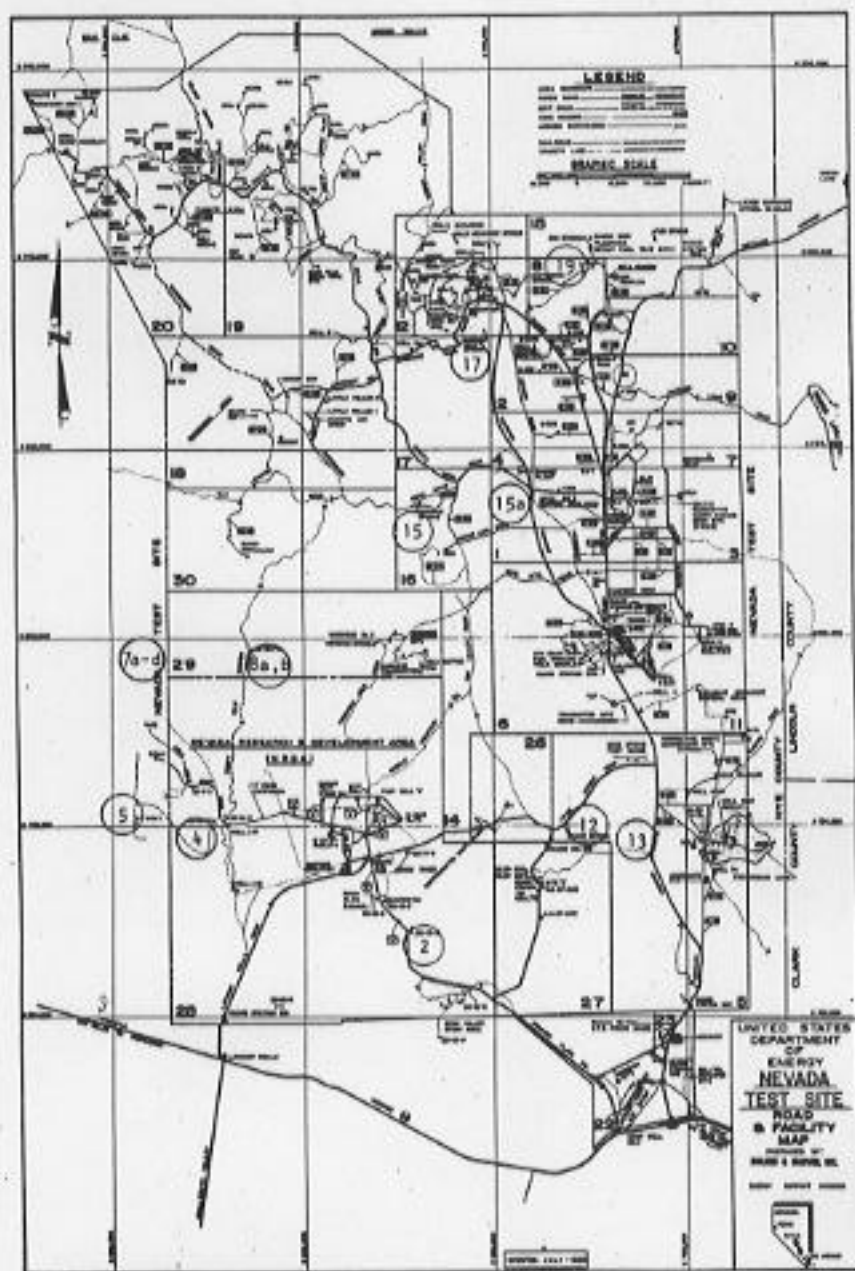
CHAPTER FIVE

ETHNOGRAPHIC SUMMARY OF NATIVE AMERICAN PLANT USE

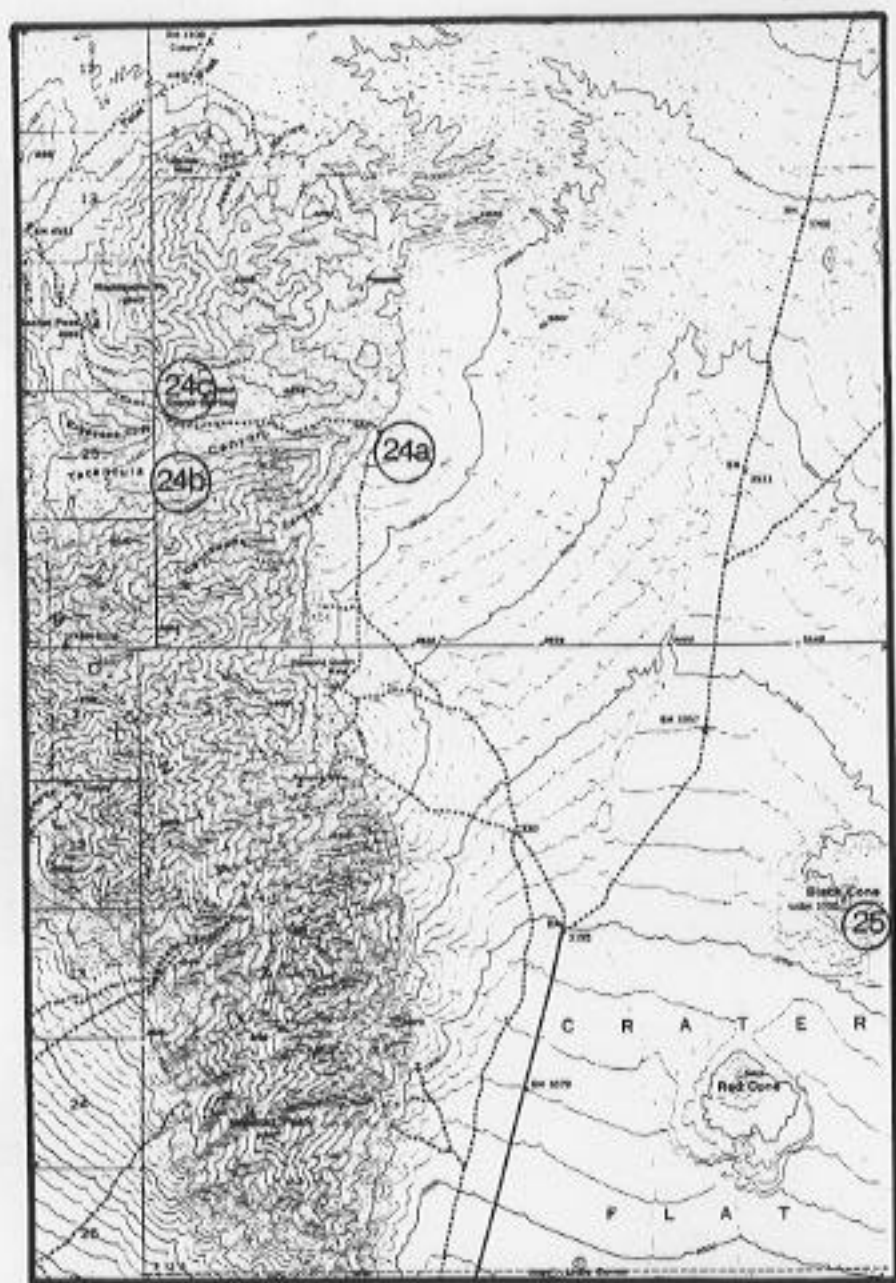
Native American people who historically inhabited the region surrounding the Yucca Mountain study area exploited a wide variety of vegetative resources in multiple ecozones. During the ethnobotanical studies conducted as part of the Yucca Mountain project, Native American representatives of the 16 involved tribes (3 ethnic groups) identified and discussed traditional and current uses of 76 species of plants in the study area, both on-reservation and during on-site visits to 23 sites (see Maps 11 through 13 and Appendix A).

Patterns of use, management and knowledge transmission, as well as an inventory of the 76 identified plant species that included brief ethnographic summaries, were presented in both qualitative and quantitative form in an interim report (Stoffle, Evans, Halmo, Niles and O'Farrell 1988). In addition, Native American plant specialists made recommendations as to the disposition of these cultural resources in the event groundbreaking activities as part of site characterization would potentially adversely affect them. These recommendations were presented in another report (Stoffle, Evans and Halmo 1988). They are also presented in Chapter Six of this report.

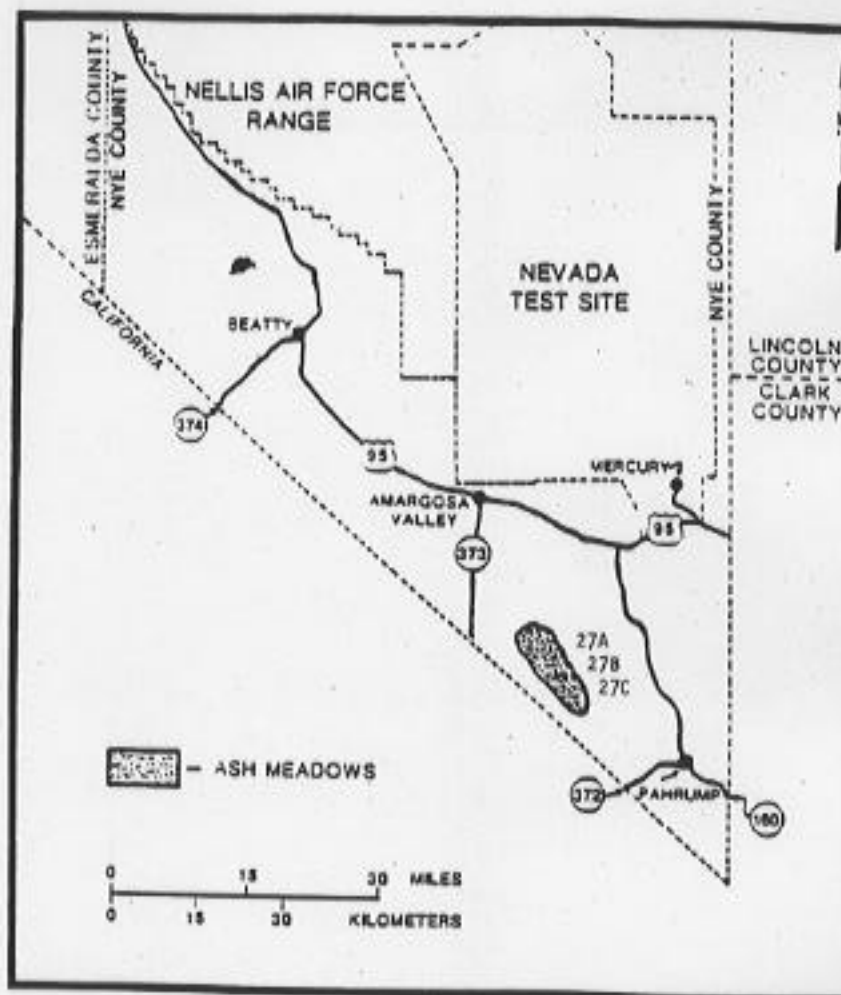
This chapter summarizes the results of the ethnobotanical study in a qualitative, ethnographic manner. Data are presented from the 381 plant-specific interviews and focus on uses, seasons of procurement, storage, preparation and management methods. Rather than presenting brief summaries for each individual plant species, however, the present chapter provides longer, more detailed ethnographic summaries for functional groupings of plants used for food, medicine, manufacture and other utilitarian purposes among the three involved ethnic groups. Plants which have special religious, ceremonial or mythological significance and those which were traditionally avoided or otherwise not used are also discussed. It is appropriate to note here that the vast majority of plants had multiple uses, so certain species will appear under more than one use



Map 11. Overview of Ethnobotanical Sites Visited



Map 12. Crater Flats and Tarantula Canyon Ethnobotanical Sites



Map 13. Ash Meadows Ethnobotanical Sites

category. Tables 5.0 and 5.1 lists each individual plant species identified by Native American plant experts and collected by the ethnographic study team. Photos of each plant specimen can be found in the team's previous report (Stoffle, Evans, Halmo, Niles and O'Farrell 1988). The specimens themselves are deposited in the herbarium at the University of Nevada-Las Vegas.

Several of the sites visited during the archaeological on-site visits were revisited during the ethnobotanical on-site visits at the request of the Indian people who participated in the initial field work. Indian representatives felt that they could more easily identify plants at the sites later in the season, as well as provide additional interpretation of these resources as components of local use areas (see Chapter Four). Consequently, ethnographers, botanists and project management personnel selected sites in the Dune Wash, Yucca Wash, Fortymile Canyon, White Rock Spring, Crater Flat/Bare Mountain, Skull Mountain and Ash Meadows local use areas for revisitation, in addition to others (Stoffle, Evans, Halmo, Niles and O'Farrell 1988:99-116; see Chapter Four and Appendix A).

Food Plants

Native American people who historically inhabited the Yucca Mountain study area and vicinity traditionally harvested, cultivated, encouraged, or otherwise managed a wide array of edible plants found in the Great Basin desert environments. Seeds, nuts, fruits, roots, bulbs and greens were harvested throughout certain periods or seasons of the yearly cycle.

Some groups propagated preferred and highly valued species by transplanting seeds and cuttings of certain plants, cultivating them near water sources, and encouraging their growth by setting deliberate fires to overgrown brush and grasslands containing dead biomass. Burning these areas fostered fresh new growth of preferred seed, fiber and leafy green plants used for food. This new growth also attracted numerous small and large game animals for hunting. Fifty-five plants were identified as being food resources during the Yucca Mountain ethnobotanical study.

Table 5.0. INDIAN NAMES FOR PLANTS IDENTIFIED
IN THE YUCCA MOUNTAIN STUDY AREA

PLANT	WESTERN SHOSHONE	SOUTHERN PAIUTE	OWENS VALLEY PAIUTE
<i>Amelanchier utahensis</i>	not identified	not remembered	not identified
<i>Amorpha canescens</i>	not identified	not remembered	not identified
<i>Anemopsis californica</i>	not remembered	not remembered	not identified
<i>Arabis pulchra</i>	not identified	not remembered	not identified
<i>Artemisia ludoviciana</i>	not identified	not remembered	not identified
<i>Artemisia tridentata</i>	not identified	not remembered	not identified
<i>Atriplex canescens</i>	not identified	not remembered	not identified
<i>Atriplex confertifolia</i>	not identified	not remembered	not identified
<i>Brodiaea pulchella</i>	not identified	not remembered	not identified
<i>Calochortus flexuosus</i>	not identified	not remembered	not identified
<i>Castilleja chromola</i>	not identified	not remembered	not identified
<i>Chrysothamnus nauseosus</i>	not identified	not remembered	not identified
<i>Cirsium mohavense</i>	not identified	not remembered	not identified
<i>Coleogyne ramosissima</i>	not identified	not remembered	not identified
<i>Coryphantha viscaria</i>	not identified	not remembered	not identified
<i>Datura meteloides</i>	not identified	not remembered	not identified
<i>Delphinium parishii</i>	not identified	not remembered	not identified
<i>Descurainia pinnata</i>	not identified	not remembered	not identified
<i>Descurainia sophia</i>	not identified	not remembered	not identified
<i>Dieckmannia spicata</i>	not identified	not remembered	not identified
<i>Echinocactus polycephalus</i>	not identified	not remembered	not identified
<i>Echinocereus engelmannii</i>	not identified	not remembered	not identified
<i>Encelia virginensis</i>	not identified	not remembered	not identified
<i>Ephedra nevadensis</i>	not identified	not remembered	not identified
<i>Ephedra viridis</i>	not identified	not remembered	not identified
<i>Eriogonum inflatum</i>	not identified	not remembered	not identified
<i>Euphorbia albomarginata</i>	not identified	not remembered	not identified
<i>Geastrum sp.</i>	not identified	not remembered	not identified

PLANT	WESTERN SHOSHONE	SOUTHERN PAIUTE	OWENS VALLEY PAIUTE
<i>Gutierrezia microcephala</i>	<i>tasishipi</i>	not identified	not identified
<i>Juncus maritimus</i>	<i>sonapi</i>	<i>pa'ap</i>	not remembered
<i>Juniperus osteosperma</i>	<i>sahwavi</i>	<i>wa'ap</i>	<i>huvava</i>
<i>Krameria parvifolia</i>	not identified	<i>nugawarowamp</i>	not identified
<i>Larrea tridentata</i>	<i>yatumbi</i>	<i>yatumpi; yatump</i>	not remembered
<i>Lichen</i>	not identified	<i>u'up; hu'up</i>	not identified
<i>Lycium andersonii</i>	<i>huapi</i>	<i>pa'ap</i>	<i>huapia</i>
<i>Lycium pallidum</i>	<i>huapi</i>	not remembered	<i>huapia</i>
<i>Menodora spinescens</i>	<i>huapi</i>	not remembered	not identified
<i>Mentzelia albicaulis</i>	<i>pacia; kua</i>	not remembered	not identified
<i>Nicotiana trigonophylla</i>	<i>ponibi</i>	<i>sawawapi</i>	not identified
<i>Opuntia basilaris</i>	<i>nugwa</i>	not remembered	not identified
<i>Opuntia echinocarpa</i>	<i>watumbu</i>	not remembered	not identified
<i>Opuntia erinacea</i>	not identified	<i>manavi</i>	not identified
<i>Oryopsis hymenoides</i>	<i>wai</i>	<i>wa'at; wa'ir</i>	<i>wai</i>
<i>Peraphyllum ramosissimum</i>	not identified	<i>nuvi</i>	not identified
<i>Pinagmites australis</i>	not remembered	<i>pa'awap</i>	<i>phavi</i>
<i>Pinus monophylla</i>	<i>walapi; tuwah</i>	<i>tuwapi; tuwawap</i>	<i>tuwapi</i>
<i>Prosopis glandulosa</i>	<i>o'phi</i>	<i>o'pomb</i>	not identified
<i>Prosopis pubescens</i>	not identified	<i>w'umpi; kwierum</i>	not identified
<i>Pseudotsuga polydenius</i>	<i>muipuh</i>	not identified	not remembered
<i>Parthenia glandulosa</i>	<i>huapi</i>	<i>u'up</i>	<i>tuwapi</i>
<i>Quercus gambelii</i>	not identified	<i>kwaw</i>	not identified
<i>Rhus trilobata</i>	not identified	<i>su'ur</i>	not identified
<i>Rumex crispus</i>	not identified	<i>nambina</i>	not identified
<i>Salix erugata</i>	<i>kwahinavi</i>	<i>kawar</i>	<i>su'huva</i>
<i>Salix gooddingii</i>	<i>suusi</i>	<i>powawaw</i>	not identified
<i>Salvia columbariae</i>	<i>pacia</i>	<i>pacia</i>	<i>pacia</i>
<i>Salvia dorrii</i>	not identified	<i>nugawawapi; kwatamawum</i>	not identified
<i>Sphaeralcea ambigua</i>	not identified	not remembered	not identified
<i>Stanleya pinnata</i>	<i>tuwara</i>	<i>tuwar</i>	<i>yuhwara</i>
<i>Stephanomeria sp.</i>	not identified	not remembered	not identified

PLANT	WESTERN SHOSHONE	SOUTHERN PAIUTE	OWENS VALLEY PAIUTE
<i>Salix speciosa</i>	not identified	not remembered	not remembered
<i>Streptanthella longirostris</i>	not identified	not remembered	not identified
<i>Streptanthus cordatus</i>	not identified	not remembered	not identified
<i>Suaeda torreyana</i>	not identified	not remembered	not identified
<i>Symphoricarpos longiflorus</i>	not identified	not remembered	not identified
<i>Tessaria sericea</i>	not identified	not remembered	not identified
<i>Thamnosma montana</i>	not identified	<i>muḡra ḡḡi</i>	not identified
<i>Thelypodium integrifolium</i>	not identified	<i>namḡḡa</i>	not identified
<i>Typus latifolia</i>	<i>toḡḡ</i>	not remembered	not remembered
<i>Veronica anagallis</i>	<i>toḡḡ</i>	not remembered; <i>paḡḡḡḡ(?)</i>	not remembered
<i>Vitis californica</i>	not identified	not remembered	not remembered
<i>Xylolobus torreyana</i>	<i>muḡḡḡ</i>	<i>i'ay: ḡḡḡḡḡḡ</i>	not identified
<i>Yucca baccata</i>	not identified	not identified	not identified
<i>Yucca brevifolia</i>	<i>ḡḡḡḡ</i>	<i>u'wḡḡ</i>	not identified
<i>Yucca schottii</i>	not remembered	not remembered	not identified
		<i>tachḡḡḡḡ; u'ḡḡḡḡ</i>	not identified

Table 5.1 NATIVE AMERICAN PLANTS IDENTIFIED DURING
THE YUCCA MOUNTAIN ETHNOBOTANY ON-SITE VISITS

SCIENTIFIC NAME	COMMON NAME
<i>Amelanchier utahensis</i>	serviceberry
<i>Amsinckia tessellata</i>	fiddleneck
<i>Anemopsis californica</i>	yerba mansa
<i>Arabis pulchra</i>	wild mustard
<i>Artemisia ludoviciana</i>	black sagebrush
<i>Artemisia tridentata</i>	big sagebrush
<i>Atriplex canescens</i>	four-winged saltbush
<i>Atriplex confertifolia</i>	shadscale
<i>Brodiaea pulchella</i>	desert hyacinth
<i>Calochortus flexuosus</i>	mariposa lily
<i>Castilleja chromosa</i>	Indian paintbrush
<i>Chrysothamnus nauseosus</i>	rabbitbrush
<i>Cirsium mohavense</i>	desert thistle
<i>Coleogyne ramosissima</i>	blackbrush
<i>Coryphantha vivipara</i> var. <i>desertii</i>	fishhook cactus
<i>Datura meteloides</i>	jimsonweed
<i>Delphinium parishii</i>	larkspur
<i>Descurainia pinnata</i>	tansy mustard
<i>Descurainia sophia</i>	tansy mustard
<i>Distichlis spicata</i>	saltgrass
<i>Echinocactus polycephalus</i>	cotton-top cactus
<i>Echinocereus engelmannii</i>	hedge hog cactus
<i>Encelia virginensis</i> var. <i>actonii</i>	brittlebush
<i>Ephedra nevadensis</i>	Indian tea
<i>Ephedra viridis</i>	Indian tea
<i>Eriogonum inflatum</i>	desert trumpet
<i>Euphorbia albomarginata</i>	rattlesnake weed
<i>Gaistrum sp.</i>	earthstar
<i>Gutierrezia microcephala</i>	matchweed
<i>Juncus mexicanus</i>	wiregrass
<i>Juniperus osteosperma</i>	juniper, cedar
<i>Krameria parvifolia</i>	range ratany
<i>Larrea tridentata</i>	creosote bush, greasewood
<i>Lichen</i>	lichen
<i>Lycium andersonii</i>	wolfberry
<i>Lycium pallidum</i>	wolfberry
<i>Menodora spinescens</i>	spiny menodora

Table 5.2 SEED PLANTS USED AS FOOD BY NATIVE AMERICA
IN THE YUCCA MOUNTAIN AREA

SCIENTIFIC NAME	COMMON NAME
<i>Amsinckia tessellata</i>	fiddleneck
<i>Arabis pulchra</i>	wild mustard
<i>Castilleja chromosa</i>	Indian paintbrush
<i>Descurainia pinnata</i>	tansymustard
<i>Descurainia sophia</i>	tansymustard
<i>Krameria parvifolia</i>	range ratany
<i>Menodora spinescens</i>	spiny menodora
<i>Mentzelia albicaulis</i>	desert corsage
<i>Oryzopsis hymenoides</i>	Indian ricegrass
<i>Salvia columbariae</i>	chia sage
<i>Sphaeralcea ambigua</i>	globe mallow
<i>Stipa speciosa</i>	bunchgrass
<i>Streptanthella longirostris</i>	wild mustard
<i>Streptanthus cordatus</i>	wild mustard
<i>Vitis arizonica</i>	wild grape

Table 5.3 CACTUS AND YUCCA FRUITS USED AS FOOD BY
NATIVE AMERICANS IN THE YUCCA MOUNTAIN AREA

SCIENTIFIC NAME	COMMON NAME
A. CACTUS	
<i>Coryphantha vivipara</i>	fishhook cactus
<i>Echinocereus engelmannii</i>	hedgehog cactus
<i>Opuntia basilaris</i>	beavertail cactus
<i>Opuntia erinacea</i>	Mojave prickly pear
B. YUCCA	
<i>Yucca baccata</i>	banana yucca
<i>Yucca brevifolia</i>	Joshua tree
<i>Yucca schidigera</i>	Mojave yucca; Spanish bayonet

by the Indian plant specialists. These are also listed in Table 5.3. The fruits of banana yucca and Mojave yucca, or Spanish bayonet, were eaten raw when ripe or roasted. Southern Paiutes transplanted cuttings of banana yucca to selected areas near their homes. Harvesting occurred in late spring and summer.

Additionally, the fruits of the Joshua tree were roasted or boiled and eaten in season by Western Shoshone people. There is some indication that this species was also transplanted to areas in proximity to residences.

Berry Bushes, Trees and Vines. The berries or fruits of six bush species, one tree and one vine were eaten by Native American people in the study area. Table 5.4 lists these species. Berries were eaten fresh, mashed and mixed with water in the making of juices and jams, or dried and stored for later use throughout the year. The fruits of squawbush were managed by Southern Paiutes who burned stands of the plant to encourage annual regrowth of highly valued basketry shoots in addition to transplanting cuttings of the plant for easier access. The management technique of deliberate burning to encourage valued basketry materials also served to encourage the growth of preferred fruit. Another preferred berry among all three ethnic groups was the wolfberry, called *huupi* by Western Shoshone people, *u'up(i)* by Southern Paiutes, and *huupia* by Owens Valley Paiutes. Additionally, the berries of another variety of wolfberry (*Lycium pallidum*) were also consumed, and referred to by similar names. Southern Paiutes, for example, noted that this variety had larger and sweeter berries. Because it is usually found closer to water, it is called *pa'up* (*pa'a* or *pa'* being the Southern Paiute term for water, and *up* being a derivative of *u'up*). These berries are still consumed today.

Bean-Pod-Pith. The beans and pithy pods of both mesquite and screwbean, listed in Table 5.5, were important foods among Native American people in the study area. Mesquite beans and pod-pith are very nutritious food items. Ethnohistoric evidence suggests that Southern Paiute people transplanted mesquite beans in order to increase the highly valued bean crop as well as to establish new groves for the purpose of providing shade and locating dwellings. Mesquite has been described as being the most important resource among Rancherian culture area peoples (Dobyns and Euler 1980:53), much like the acorn among California Native Americans (Stoffle and Dobyns 1983:63-64; Stoffle, Dobyns and Evans 1983:34-35).

The pods and beans of mesquite and screwbean were mashed and ground into a mush or gravy or dried as cakes. The sweet-tasting pods of

Table 5.4 BERRY BUSHES, TREES AND VINES USED AS FOOD
NATIVE AMERICANS IN THE YUCCA MOUNTAIN AREA

SCIENTIFIC NAME	COMMON NAME
<i>Amelanchier utahensis</i>	serviceberry
<i>Juniperus osteosperma</i>	juniper, cedar
<i>Lycium andersonii</i>	wolfberry
<i>Lycium pallidum</i>	wolfberry
<i>Menodora spinescens</i>	spiny menodora
<i>Rhus trilobata</i>	squawbush
<i>Symphoricarpos longiflorus</i>	snowberry
<i>Vitis arizonica</i>	wild grape

Table 5.5 BEAN POD-PITH USED AS FOOD BY NATIVE AMERICANS
IN THE YUCCA MOUNTAIN AREA

SCIENTIFIC NAME	COMMON NAME
<i>Prosopis glandulosa</i>	mesquite
<i>Prosopis pubescens</i>	screwbean

mesquite were also eaten raw. The pods were harvested in late spring and summer when ripe. Once ground and dried, mesquite pod cakes could be stored for long periods throughout the year. These highly valued foods are still eaten today by Southern Paiute and Western Shoshone people.

Greens. The fresh, young green leaves and stems of 12 plant species were consumed in season as salad greens. These are listed in Table 5.6. Some varieties were stored for short periods of time. Today, more highly valued species such as *Stanleya pinnata* are eaten throughout the entire year by members of all three ethnic groups. Southern Paiute plant specialists mentioned that they even store the plant in their freezers for year-round consumption. In addition, oral testimony and observations made during the on-site visit portion of the ethnobotanical study made

Table 5.6 GREENS USED AS FOOD BY NATIVE AMERICANS
IN THE YUCCA MOUNTAIN AREA

SCIENTIFIC NAME	COMMON NAME
<i>Amsinckia tessellata</i>	fiddleneck
<i>Cirsium mohavense</i>	desert thistle
<i>Descurainia pinnata</i>	tansymustard
<i>Descurainia sophia</i>	tansymustard
<i>Eriogonum inflatum</i>	desert trumpet
<i>Juncus mexicanus</i>	wiregrass
<i>Rumex crispus</i>	dock; wild rhubarb
<i>Stanleya pinnata</i>	Indian spinach
<i>Thelypodium integrifolium</i>	wild cabbage
<i>Typha domingensis</i>	cattail
<i>Typha latifolia</i>	cattail
<i>Veronica anagallis-aquatica</i>	speedwell

clear that Southern Paiute people managed this variety of Indian spinach relatively intensively. Management techniques involved breaking the dried, central stem or stalk off the plant in order to stimulate new growth of fresh green leaves the following year. Most species of greens were, and still are, eaten fresh or boiled like modern-day spinach.

Nuts. Native American people consumed the nuts from 2 species of trees. These were the pinyon pine and the acorn, listed in Table 5.7. Nuts could be roasted in underground pits or boiled and eaten as a gravy-like stew. Harvesting of these nuts, particularly the pinyon, involved the cooperation of large numbers of people, major social gatherings, ceremonies, and negotiating use agreements among leaders and other members of various ethnic groups, all of which continue to a large extent today. The pinyon nut remains a very important food item among each of the involved Indian ethnic groups today.

Table 5.7 NUTS USED AS FOOD BY NATIVE AMERICANS
IN THE YUCCA MOUNTAIN AREA

SCIENTIFIC NAME	COMMON NAME
<i>Pinus monophylla</i>	pinyon pine
<i>Quercus gambelii</i>	scrub oak

Roots, Bulbs and Tubers. The bulbs or corms of 2 species of plants variously known as wild onion and sego or mariposa lily were consumed as needed by Native American people. In addition, the roots of 2 species of cattail (*Typha* spp. *domingensis* and *latifolia*) were eaten. These plants are listed in Table 5.8. Harvesting these plants simply involved digging up the edible parts and eating them either raw or after boiling. Mariposa lily and wild onion may have served the important function of being "famine foods" which Native Americans relied upon when cultivated and other food supplies were in short supply.

Table 5.8 ROOTS, BULBS AND TUBERS USED AS FOOD BY
NATIVE AMERICANS IN THE YUCCA MOUNTAIN AREA

SCIENTIFIC NAME	COMMON NAME	PART EATEN
<i>Brodiaea pulchella</i>	desert hyacinth	bulb/corm
<i>Calochortus flexuosus</i>	mariposa lily	bulb
<i>Typha latifolia</i>	cattail	root

Miscellaneous Foods. As listed in Table 5.9, Native Americans in the study area consumed the pollen, contained in the inflorescence or flower cluster, of both species of cattail. In addition, they ate the sugary extra derived from the leaves of the reed or cane (*Phragmites australis*). Known

Table 5.9 MISCELLANEOUS FOODS EATEN BY
NATIVE AMERICANS IN THE YUCCA MOUNTAIN AREA

SCIENTIFIC NAME	COMMON NAME	PART EATEN
<i>Distichlis spicata</i>	saltgrass	exudate
<i>Phragmites australis</i>	cane, reed	exudate
<i>Stephanomeria sp.</i>	"gum bush"	sap
<i>Typha domingensis</i>	cattail	pollen
<i>Typha latifolia</i>	cattail	pollen

locally as "sugar cane" and by scientists as "honey dew" (Heizer 1945; Stoffle and Dobyns 1983:87), this sweet-tasting exudate was scraped off the leaves. Owens Valley Paiute people also scraped the salty extract off the leaves of saltgrass (*Distichlis spicata*) and consumed it. It served as a salt substitute when imported salt was in short supply. As a snack item, the sap of the "gum bush" (an Indian folk name for *Stephanomeria sp.*) was scraped off the branches and chewed as gum by Southern Paiutes.

Medicinal Plants

Twenty plants were identified by the Native American plant experts as being used for medicinal purposes. The majority of these plants were brewed as teas, while others were prepared as poultices, compresses, chews, washes and smoking materials. Several of the medicinal tea plants served multiple purposes in treating a variety of ailments.

Teas/Beverages

Thirteen plant species were reported as being used for brewing medicinal teas by the Native American plant specialists. These are listed in Table 5.10. Leaves, stems, twigs, roots and bark of these plants were mixed with water, boiled and ingested for various ailments and illnesses as well as being drunk as everyday beverages. Consumption of teas brewed from *Ephedra* species continue on a frequent basis, and Native American individuals still store the necessary parts of these plants for year-round use.

Table 5.10 PLANTS USED FOR MEDICINAL TEAS AND/OR BEVERAGES BY NATIVE AMERICANS IN THE YUCCA MOUNTAIN AREA

SCIENTIFIC NAME	COMMON NAME
<i>Anemopsis californica</i>	yerba mansa
<i>Artemisia ludoviciana</i>	water sage
<i>Artemisia tridentata</i>	big sagebrush
<i>Chrysothamnus nauseosus</i>	rabbit brush
<i>Datura meteloides</i>	jimsonweed
<i>Ephedra nevadensis</i>	Indian tea
<i>Ephedra viridis</i>	Indian tea
<i>Gutierrezia miesocephala</i>	matchweed
<i>Juniperus osteosperma</i>	juniper, cedar
<i>Larrea tridentata</i>	greasewood, creosote
<i>Psoralea polydenia</i>	dotted dalea
<i>Salix exigua</i>	willow
<i>Thamnosma montana</i>	turpentine bush

Poultices, Powders, Washes and Chews

Table 5.11 lists the 12 plants that were reported by Native American plant specialists as being used to treat cuts, bruises, sores, aches, pains, infections and inflammations. The plants used as poultices for cuts, sores and the like generally involved packing the leaves on the ailment in a topical manner. Use of plants as washes involved boiling the leaves and stems of the plant and then using the liquid as bath water or simply sponging the afflicted person with it. The milky sap from the stems, leaves and flowers of the spurge, or rattlesnake weed (for which the Southern Paiute term, *tuvi-pax-gaiv*, means "necklace for the ground"), is used as a wash to treat eye ailments, including cataracts. The bark of willow was either boiled and drunk or chewed as an aspirin-type of medication to relieve headaches.

Preparation of medicinal powders usually entailed grinding dried leaves and then placing the powder on cuts and sores, either with or

Table 5.11 MEDICINAL POULTICES, POWDERS, WASHES AND CHEWS USED BY NATIVE AMERICANS IN THE YUCCA MOUNTAIN AREA

SCIENTIFIC NAME	COMMON NAME	FUNCTION
<i>Anemopsis californica</i>	yerba mansa	wash
<i>Artemisia tridentata</i>	big sagebrush	poultice, chew
<i>Atriplex confertifolia</i>	shadscale	poultice, powder
<i>Datura meteloides</i>	jimsonweed	powder
<i>Euphorbia albomarginata</i>	spurge	wash, poultice
<i>Lichen</i>	lichen	poultice, powder
<i>Nicotiana trigonophylla</i>	Indian tobacco	smoke
<i>Pinus monophylla</i>	pinyon pine	chew
<i>Purshia glandulosa</i>	buckbrush	poultice
<i>Salix exigua</i>	willow	chew
<i>Salvia dorri</i>	Indian tobacco	smoke
<i>Suaeda torreyana</i>	seepweed	poultice
<i>Xylorhiza tortifolia</i>	desert aster	poultice

without water. Powder from ground lichen, for example, was packed inside of the mouth by Southern Paiutes to relieve sores. In contrast, the jimsonweed plant was either roasted or baked and ground up into a powder, mixed with water and ingested as a drink by those using it for medicinal or ceremonial purposes.

The gathering of medicinal plants of all kinds involved certain general and individual rituals. Plant specialists from each tribal/ethnic group reported that the plant was talked or prayed to and asked to provide a cure for the particular ailment. Like other plants, but perhaps more so, medicinal plants were perceived to have human-like qualities, and were therefore addressed as humans. When harvesting these plants, Native American individuals usually took only as much as they needed (usually a handful, although larger quantities of Indian tea, for example, were harvested for long-term use). The plant was then thanked for providing its curing power. Southern Paiute plant experts reported that

medicinal plants were always harvested in the direction of the sun; that is, parts taken were picked from the side of the plant facing east.

It appears that religious doctrine among all three ethnic groups prohibited moving medicinal plants. This religious prohibition may stem from the belief that the life-force of medicinal plants, or the power derived from them, extend to the soil around and underneath the plants. Thus, to move the plant would lessen its power or capacity to cure a particular ailment, if not make it sad or angry. All plant experts pointed out that the Creator had placed particular plants in particular locations for a particular purpose, and should therefore not be moved. This is particularly the case for medicinal plants.

Plants Used In Construction and Manufacture

Native American plant specialists identified 27 plants as being used in either the construction of dwellings and other structures or the manufacture of a wide variety of utilitarian items. These are discussed below.

Construction

Table 5.12 lists the 11 plants identified by plant experts as being used in the construction of dwellings and other structures. In addition to houses, native plants and trees were used to make sweathouses, ramadas, fences, animal pens and corrals. Early eyewitness accounts of Southern Paiute farming indicate that tree trunks were even hollowed out and used as irrigation flumes to divert the flow of stream water onto crops—at least among Utah Southern Paiutes (Stoffle and Dobyns 1983:51).

For construction purposes, the wood of the juniper, mesquite, screwbean and willow trees were generally cut for use in the building of house and pen walls as well as fence posts. Stems and branches of bushes such as rabbitbrush and arrowweed, as well as cane and cattail plants, on the other hand, were commonly used as filler or insulation for house walls, roofs and interior ceilings. These resources could be gathered as needed throughout the year.

Table 5.12 PLANTS USED IN CONSTRUCTION BY NATIVE AMERICANS IN THE YUCCA MOUNTAIN AREA

SCIENTIFIC NAME	COMMON NAME
<i>Chrysothamnus nauseosus</i>	rabbitbrush
<i>Juncus mexicanus</i>	wiregrass
<i>Juniperus osteosperma</i>	juniper, cedar
<i>Phragmites australis</i>	cane, reed
<i>Prosopis glandulosa</i>	mesquite
<i>Prosopis pubescens</i>	screwbean
<i>Salix exigua</i>	willow
<i>Salix gooddingii</i>	black willow
<i>Tessaria sericeae</i>	arrowweed
<i>Typha domingensis</i>	cattail
<i>Typha latifolia</i>	cattail

Manufacture

Native American plant experts identified 25 plants used in the manufacture of various utilitarian items ranging from weapons, sandals and clothing to burden and ceremonial baskets. These plants are listed in Table 5.13, along with the specific items they were used for.

Among the plants used in manufacture, several stand out as having special value. Willow was repeatedly mentioned by plant specialists as being the preferred basket-making material. Among Southern Paiutes, however, the most preferred basket-making material is the squawbush (*Rhus trilobata*, Southern Paiute *su'uv*). So highly valued is the squawbush, it is commonly referred to as a type of willow among Southern Paiutes, and their term for it closely resembles Western Shoshone and Owens Valley Paiute terms for true willow species (*Salix spp. exigua* and *gooddingii*, called *suavi* by Western Shoshone and *su'huva* by Owens Valley Paiute people). Among Southern Paiutes, the young shoots of squawbush are preferred over all others for making baskets. It is used in the making of the famous Navajo wedding basket, a basket which Willow Springs Southern Paiutes make and one which Navajo medicine men actively seek

out for purchase. Squawbush is also used for making cradleboards, winnowing baskets and other utilitarian items. As mentioned previously, squawbush stands are burned on a regular (annual) basis by some Southern Paiutes to encourage new growth. The plant is also pruned, much like willow, to encourage growth of straight shoots ideal for basketry. The plant also appears to have been transplanted near homes for easy access. Despite the latter, squawbush is perceived by Southern Paiutes as becoming increasingly rare.

Among Western Shoshone and Owens Valley Paiute people, the willow (*Salix exigua*) is preferred for making baskets. This particular species is called *kwishisuvi*, or "weaving tree," by Western Shoshone people, in contrast to black willow (*S. gooddingii*), which is known by the term *suvi*. As mentioned above, Owens Valley Paiute people call it *su'huva*. Willow is also highly valued among Southern Paiutes, who call the varieties *kanav* and *pawaxanav*, respectively.

Members of all three ethnic groups commonly use the other plants used in basketry. These include the roots of the Joshua tree, wiregrass or sedge, and species of cattail and yucca. Basket materials are generally stripped of bark, split, coiled and dried for year-round use. When ready to use, they are simply soaked in water, a technique which restores the fibers' flexibility. Similarly, basket plants which are used for dye are soaked in water. Wiregrass and other basket plants may be bleached in the sun to enhance their yellow or white colors. Owens Valley Paiute plant experts noted that their people made boats or rafts as well as shelters out of the common reed plant (*Phragmites australis*).

As can be seen from Table 5.13, Native Americans utilized many species of plants for items ranging from needles for sewing and bodily ornamentation (e.g., piercing ears), to diapers, cradleboards, hairbrushes, sandals, skirts and mats, as well as weapons, bonding agents, canes, and ceremonial baskets for sale or trade. It can be seen that plants such as these served Indian people throughout the economic, religious and domestic life cycles of the individual, family, household and village as well as the larger tribe and ethnic group. The majority of these plants are currently used for the same purposes.

Fuel

The Native American plant experts mentioned 11 plants that were used as fuel. These are listed in Table 5.14. Among the preferred woods

Table 5.13 PLANTS USED IN MANUFACTURE BY NATIVE AMERICANS IN THE YUCCA MOUNTAIN AREA

SCIENTIFIC NAME	COMMON NAME	FUNCTION
<i>Atriplex canescens</i>	four-winged saltbush	arrows
<i>Echinocactus polycephalus</i>	barrel cactus	awls, needles
<i>Encelia virginensis</i>	brittlebush	baskets
<i>Eriogonum inflatum</i>	desert trumpet	pipe
<i>Juncus mexicanus</i>	wiregrass	baskets, decoys
<i>Larrea tridentata</i>	greasewood, creosote	sap glue
<i>Opuntia echinocarpa</i>	golden cholla	awls, needles
<i>Peraphyllum ramosissimum</i>	squawapple	baskets
<i>Phragmites australis</i>	cane, reed	arrowshafts
<i>Pinus monophylla</i>	pinyon pine	baskets, pitch
<i>Prosopis glandulosa</i>	mesquite	
<i>Prosopis pubescens</i>	screwbean	
<i>Purshia glandulosa</i>	buckbrush	diapers, rope, clothing, blankets
<i>Quercus gambelii</i>	scrub oak	spears, bows, canes
<i>Rhus trilobata</i>	squawbush	baskets, cradleboards
<i>Salix exigua</i>	willow	baskets, jugs, cradleboards
<i>Salix gooddingii</i>	black willow	baskets, jugs, cradleboards
<i>Stipa speciosa</i>	bunchgrass	hairbrush
<i>Tessaria sericeae</i>	arrowweed	arrows
<i>Thamnosma montana</i>	turpentine bush	needles
<i>Typha domingensis</i>	cattail	baskets, mats, shelters, boats
<i>Typha latifolia</i>	cattail	baskets, mats, boats
<i>Yucca baccata</i>	banana yucca	baskets
<i>Yucca brevifolia</i>	Joshua tree	baskets, sandals
<i>Yucca schidigera</i>	Mojave yucca	baskets

Table 5.14 WOODS USED AS FUEL BY NATIVE AMERICANS
IN THE YUCCA MOUNTAIN AREA

SCIENTIFIC NAME	COMMON NAME
<i>Atriplex canescens</i>	four-winged saltbush
<i>Atriplex confertifolia</i>	shadscale
<i>Juniperus osteosperma</i>	juniper, cedar
<i>Larrea tridentata</i>	greasewood, creosote
<i>Pinus monophylla</i>	pinyon pine
<i>Prosopis glandulosa</i>	mesquite
<i>Prosopis pubescens</i>	screwbean
<i>Purshia glandulosa</i>	buckbrush
<i>Quercus gambelii</i>	scrub oak
<i>Typha domingensis</i> (kindling)	cattail
<i>Typha latifolia</i> (kindling)	cattail

were the creosote bush (*Larrea tridentata*, Western Shoshone *yatumbi*) which was said to burn long, hot and blue by Western Shoshone plant specialists, and mesquite, which also burned long and hot. Frequently Native Americans traveled long distances to collect and haul back to their villages preferred fuelwood. Other types of wood were gathered as needed when camping, and served additional functions when burned in sweathouses and during rituals and ceremonies (see below).

Ritual and Ceremonial Plants

Eight plants were identified as having ritual and ceremonial uses by the Native American plant specialists. Table 5.15 lists these. Perhaps the most commonly or frequently used species are big sagebrush and the juniper or cedar tree. Many individuals from all three ethnic groups, and particularly medicine men or women, burn sage and or juniper when praying, when in an unfamiliar location, and during private or public

Table 5.15 PLANTS USED IN RITUAL AND CEREMONIAL
ACTIVITIES BY NATIVE AMERICANS IN THE
YUCCA MOUNTAIN AREA

SCIENTIFIC NAME	COMMON NAME	HOW USED
<i>Artemisia tridentata</i>	big sagebrush	burned, smoked, smudge, powdered drink
<i>Datura meteloides</i>	jimsonweed	burned
<i>Juniperus osteosperma</i>	juniper, cedar	burned
<i>Larrea tridentata</i>	greasewood, creosote	burned
<i>Nicotiana trigonophylla</i>	Indian tobacco	smoked
<i>Pinus monophylla</i>	pinyon pine	sap chewed
<i>Purshia glandulosa</i>	buckbrush	house crosses
<i>Quercus gambelii</i>	scrub oak	burned

rituals and ceremonies. As examples, project ethnographers who conducted on-reservation interviews accompanied by a Southern Paiute religious leader and elder were "smoked" by him prior to departing his household for the return trip to Michigan. This ritual involved the burning of cedar, the smoke from which was "brushed" over the ethnographers using an eagle feather prayer bundle, and a prayer. The ethnographers were, in other words, blessed by the elder, who asked his ethnic deity and/or spirits to protect the ethnographers on the trip as well as a request that they provide continued success in the work effort designed to protect Indian cultural resources. Similarly, during the earlier ethnobotany on-site visits, a religious leader and elder medicine man from the Paiute Indian Tribe of Utah burned cedar and prayed to the spirits who live at the White Rock Spring site to explain the purpose of the visit and to ask that they protect the group of visitors. This was done prior to commencing any field work, in that it was an unfamiliar area to him.

For similar purposes, people also smudge ground sage powder inside of houses and thresholds, as well as in sweathouses. Sage is also burned in these contexts, and the vapors inhaled, particularly in sweathouse rituals. Medicine men or other religious practitioners traditionally smoked

Indian tobacco during rituals and ceremonies, but its use seems to have decreased according to the plant specialists. They were likely referring to members of their own ethnic group, rather than larger, pan-Indian congregations where ritual-ceremonial tobacco smoking may still occur. It may very well be that the smoke of wood and plants burned in any ritual or ceremonial context serves as a vehicle of communication with deities and spirits as it rises skyward, carrying the prayers of practitioners.

Ritual offerings of plant materials are often made by Indian people. When visiting the Black Cone site, for example, an Owens Valley Paiute woman left a small offering of pine nuts and quietly recited prayers before proceeding with the identification of plants. Tobacco and other plant offerings are often left in caves, also.

The roots of the hallucinogenic jimsonweed (*Datura meteloides*) were traditionally roasted or baked and ground into a powder, mixed with water and then ingested to induce visions as a power/knowledge-seeking ritual, most probably among apprentice shamans and others. The Native American plant specialist who reported its traditional use emphasized that the dosage had to be exact; ingestion of a large dose could potentially be fatal. When using this plant in seeking knowledge, dreams or visions, the user had to be accompanied by another person throughout the effective time period, which sometimes lasted an entire night. Considered to be a very powerful and potentially dangerous plant, contemporary Native American people are concerned about younger individuals misusing the plant as a drug for recreational purposes.

Only one plant was reported to be used in the making of a ritual or ceremonial "charm." Southern Paiute plant experts mentioned that the wood and bark of *u'nup*, or buckbrush, were used to fashion house crosses. These were hung either on the outside of the house or placed inside of the house, particularly the threshold of the entrance. It is believed that these crosses provide protection from and ward off the evil intentions of strangers and enemies, as well as of evil spirits. They also provide protection against lightning.

In contrast to the above, both oak and pinyon pine trees are not used in rituals and ceremonies so much as they are the subjects/objects of seasonal ceremonies during harvesting times. The sap or pitch of the pinyon pine, however, was reported by a Southern Paiute plant expert as being chewed during ceremonies for the purpose of curing physical deformities such as facial paralysis resulting from strokes.

Southern Paiute plant specialists mentioned three plants important in their traditional stories. Two of the stories, in which cedar and reed plants are important, were not told, in that ethnic religious doctrine specifies winter as the appropriate season for telling stories. It is at this time that elders usually pass on their traditional knowledge to younger individuals. Without relating the entire story because of this proscription, one Southern Paiute plant expert mentioned that a species of rabbitbrush (*Chrysothamnus* sp., Southern Paiute *wa'arump*) was important in the story that told of cottontail being protected by hiding under the plant when the earth was burning.

A Western Shoshone plant specialist mentioned that there was a traditional story regarding how crow spread the pinyon pine, but he could not recall the details of the story. The extreme significance of *yatumbi*, or creosote bush, in the Western Shoshone creation story has been reported in detail in a previous report (Stoffle, Evans, Halmo, Niles and O'Farrell 1988:12-14), and need not be repeated here. It should be noted that Table 4.15 does not pretend to provide an exhaustive list of plants which are significant in Native American legends using other sources such as previous ethnographic reports. It lists only those which were mentioned by the Indian plant experts in the field. There are likely many more such plants which have mythic significance.

Plants Traditionally Avoided

Table 5.17 lists the three plants which Native American plant specialists identified as being traditionally avoided. As can be seen from the table, only Southern Paiute plant experts identified plants which were avoided by their tribal/ethnic group.

Two plants, the desert hyacinth and the larkspur, were said to be poisonous and were therefore avoided according to a Chemehuevi Paiute plant expert. The reddish powder which exudes from the other plant, commonly known as earthstar, was traditionally avoided by Kaibab Paiutes for unspecified reasons. From a Western perspective, perhaps the English translation of the Southern Paiute term for the plant (*u'nupitsi ompingwu* or "devil's powder") provides an important clue as to why this fungus was avoided.

Table 5.17 PLANTS TRADITIONALLY AVOIDED

SCIENTIFIC NAME	COMMON NAME	TRIBAL/ETHNIC GROUP
<i>Brodiaea pulchella</i>	desert hyacinth	Chemehuevi Paiute
<i>Delphinium parishii</i>	larkspur	Chemehuevi Paiute
<i>Geastrum sp.</i>	earthstar	Kaibab Paiute

Urban Indian Plant Use

The Yucca Mountain ethnobotanical studies involved members or representatives of the urban Las Vegas Indian Center. This urban Native American organization provides various services and programs to approximately 5,000 Indian people of diverse tribal and ethnic backgrounds, some of whom have resided in the Las Vegas area for as long as thirty years. Many of these urban Indian individuals continue to rely on social networks, both local and covering long distances, for information on and obtaining a variety of plants for food, medicinal, ritual/ceremonial and traditional craft-making purposes. Ethnographers directly observed usage of several plants during on-reservation visits as part of the ethnobotany study. In addition to conducting plant-specific interviews with four urban Indian women as part of the on-reservation interview phase of the study, two representatives of the Indian Center participated in the site visits to the Yucca Mountain study area. During the field work, urban Indian people identified 16 plants that are still culturally important to them. Of those 16, representatives stated that 15 are still currently used (See Table 5.18).

Table 5.18 lists the plants that representatives of the Las Vegas Indian Center identified. Virtually all the plants identified by Las Vegas Indian Center members were (and are) used for the same purposes as those for the three ethnic groups. That is, plants such as willows, cattail, wiregrass and Joshua tree are used in basketry and other craft-making activities. Creosote bush, Indian tea species, the desert aster and desert trumpet are used for medicinal purposes. Food items still consumed by members and/or members of their families include tansymustard, pine

Table 5.18 PLANTS USED BY MEMBERS OF
THE LAS VEGAS INDIAN CENTER

SCIENTIFIC NAME	COMMON NAME
<i>Artemisia tridentata</i> *	big sagebrush
<i>Descurainia sophia</i> *	tansymustard
<i>Ephedra nevadensis</i> *	Indian tea
<i>Ephedra vividis</i> *	Indian tea
<i>Eriogonum inflatum</i> *	desert trumpet
<i>Juncus mexicanus</i> *	wiregrass
<i>Juniperus osteosperma</i> *	juniper, cedar
<i>Larrea tridentata</i> *	creosote, greasewood
<i>Nicotiana trigonophylla</i> *	Indian tobacco
<i>Pinus monophylla</i> *	pinyon pine
<i>Rhus trilobata</i> *	squaw bush
<i>Salix exigua</i> *	willow
<i>Salix gooddingii</i>	black willow
<i>Typha domingensis</i> *	cattail
<i>Xylorhiza tortifolia</i> *	desert aster
<i>Yucca brevifolia</i> *	Joshua tree

* = currently used by members of the Las Vegas Indian Center

nuts, Indian tea and squawberries. Finally, urban Indian people continue to burn and/or smudge sage, juniper and Indian tobacco in ritual and ceremonial contexts. Apparently, only the black willow is no longer used; the other species of willow is preferred among basketmakers.

Urban Indian concern for plant resources, as well as the cultural significance attached to them, are reflected in the remarks of Indian Center participants during the interviews along with eyewitness observations made by ethnographers during the field work. As examples, Indian tea was brewed for the meeting of the Native American Women's Association, a companion organization to the Las Vegas Indian Center, during which ethnographers conducted interviews. Additionally, ethnographers observed the exchange of medicinal plants during the meeting of the Las Vegas Indian Center Board, as well as the exchange

of basket plant materials, including devil's claw for transplanting, during the Women's Association basketry class. Like other ethnic group participants, urban Native Americans, and particularly craftspeople, perceive many of the plants upon which they rely to be increasingly rare. Many of them travel long distances to procure needed materials for their work. Consequently, among urban Indian people, social occasions in which numbers of individuals interact provide a mechanism by which plant knowledge is exchanged, as well as the resources themselves. Networks of individuals and groups cooperate in maintaining current usage of traditional plant resources. Moreover, Indian people who have moved to Las Vegas from other areas as diverse as Oklahoma and Texas have adopted the use of local plant resources, varieties of which were traditionally used back home. These newly adopted varieties are sometimes exchanged with family and ethnic group members who still reside in other locations.

The Contemporary Significance of Plants as Cultural Resources

Native American tribal/ethnic groups continue to use many of the plants identified during the Yucca Mountain ethnobotanical study. Specifically, Southern Paiute people currently use 43 of the 60 plants they identified as being traditionally used during the study; Western Shoshone people currently use 22 of the 35 that they identified; and Owens Valley Paiute people use 24 of the 32 plants that they identified.

Although the number of plants currently used is lower than the number said to be traditionally used, the decrease in part can be attributed to a restricted land base, and thus reduced access to certain species, as well as the perception that many plants traditionally used are now becoming increasingly rare. In other words, in some cases, plants which may still be significant can no longer be used, because locating and collecting them requires traveling long distances at some expense to Native American people. On many occasions, project ethnographers received responses to questions regarding current use of plants such as "if we could find it/if it still grew here, we would use it." Thus, it can be surmised that even plants which are no longer used remain significant to Native American people. Such a conclusion is comparable to the fact that, even though Native Americans have lost large portions of their traditional lands--lands perceived by them to be sacred or holy (Spicer 1957)--they still retain a high degree of sentiment for and attach special significance

to those lost lands. This heightening of significance and sentiment is common among indigenous peoples who have lost land and resource (Spicer 1971:798; Halmo 1987:22-23). One can argue by extension that the loss of resources as components of lost traditional lands also become objects of heightened significance and sentiment. They become symbol of a people's ethnic identity and historic experience (Spicer 1971). Ethnobotanists have argued that native plants can be ethnic identity symbols (Alcorn 1984; Nabhan 1985:388; 1986; Halmo 1987; Stoffle et al 1990).

Plants that are currently used also constitute ethnic cultural and identity symbols, because they permeate the daily, seasonal and yearly life cycles of family, community, tribal and ethnic group members (Stoffle et al. 1990). Thus, every time groups of people travel to harvest seasonal plants, they affirm their bonds as kinfolk through social interaction and cooperation. Likewise, each time a family, community, tribal or ethnic group member goes through a rite of passage (e.g., birth, initiation, marriage, death), plants used in rituals or ceremonies associated with that rite of passage assist the individual on his or her way as well as reaffirming the social bonds of ethnic kinship. Each time a family or larger group sits down at the table to eat a meal consisting of native plant foods, or travels to an Indian fair or pow-wow in which native plants are used to build traditional structures, they reaffirm their common ethnic identity. Finally, when an individual passes away, the surviving mourners who gather together for the funeral ceremony reaffirm their sociocultural, ethnic and religious ties to one another. Burning of ceremonial cedar and other uses of plants in that ceremony are important components of traditional practice. Because plant resources are elements which permeate virtually all forms of social interaction, they are symbolic of Western Shoshone, Southern Paiute, and Owens Valley Paiute definitions of themselves as a people. Among urban Indians, also, use of plant resources contribute to their identity as Indian people. Plants thus continue to make significant contributions to the persistent cultural systems of these people.

CHAPTER SIX

NATIVE AMERICAN RECOMMENDATIONS

This chapter presents the resolution and series of recommendations made by tribal leaders and representatives of the 16 tribes involved in the Yucca Mountain Project. These recommendations were generated during a series of four meetings held at different locations in Nevada and California in early 1988 (see Appendix A). These meetings were designed and scheduled for the purpose of allowing members of each of the 16 involved tribes to discuss potential strategies for reducing potential adverse effects of ground-disturbing activities upon traditional cultural resources during site characterization. The resolution and recommendations were drafted during deliberations of tribal leaders at a meeting held in Las Vegas, Nevada on May 5, 1988.

There was general agreement among those present at the meeting on the series of recommendations. "First choice" recommendations--those that advocate avoidance or protection of all cultural resources--represent what have been termed "holistic conservation" statements (Stoffle and Evans 1990). Such statements are commonly presented by Indian people as an indication of tribal sovereignty as well as of basic values. A holistic conservation statement usually has two main parts, one that expresses a belief about the integration of man, nature, and the supernatural and another that contains a general evaluation of whether or not a proposed project should occur in traditional Indian lands.

The Indian people present at the Las Vegas meeting agreed that it would be better not to disturb any cultural resources. With regard to artifacts, such a position stems from the belief that the owners of such artifacts left them in particular places for a specific purpose. Ancestral and other spirits may continue to use them. With regard to plants and other natural resources, this position stems from the belief that there is a plan, created by the supernatural, that has made them what they are and placed them where they are. The response, in part, is based on the belief that all plants, animals, and even physical elements have a consciousness, power, and purpose. The implications of this belief for understanding how some

Indian people interpret radioactivity as the "angry rock" were discussed in a previous report (Stoffle, Evans, Harshbarger 1988). One tribal chief explained certain elements of this belief as follows:

The best thing that could happen to the United States of America is for a group of us Indian people to be elected to address the Supreme Court. Because there are so many things that they don't really understand. It is like this black thing I am holding. Where did it come from? The earth right, because all material is from the earth. Who is to say that this part [pointing to one part of the object] is more important than that one over there [pointing to another part of the object]. We have to put these things into perspective. It is like this thing [the high-level waste proposal] that came out. They are saying, "We are not damaging that, all we are going to do is to cut down that tree." As an Indian person I feel I am important, but am I more important than that tree or is that tree more important than me. We are on this earth, we are insignificant. Indian people say, "What's more important; the earth that we stand on, the air that we breathe, or the water that we drink?" They all have their reason to be here and that is what we have to get over to the United States Supreme Court. We are nothing, but to put it all together it forms a circle. And we all have to live together no matter what, because it's our earth. These things are here, we didn't put them here, so who are we to move them. We didn't create them, but we are here to protect them.

Although Indian people tend to resent proposed projects that from their perspective inappropriately use traditional lands, they tend to be realistic about the extent of their power to affect the process and the results of these projects. When provided with an opportunity to have input in the process, Indian people have demonstrated a willingness to try to protect some cultural resources potentially affected by an unwanted project. This process has been termed "cultural triage" which is defined as a forced choice situation in which an ethnic group is faced with the decision to rank in importance equally valued cultural resources that could be affected by a proposed development project (Stoffle and Evans 1990). Cultural triage can be both emotionally taxing for the Indian person and

dangerous for the cultural resource. At the Las Vegas meeting, one tribal chair summarized the issue as follows:

I don't know that what I am hearing you [another chair] saying can't be properly addressed. Because if we state--emphatically--that we are against the project and list all the reasons why we are against it, then we have a choice; to lose it all and have no say-so and possibly lose the ability to save some of these things for future generations--those things are our culture--because it is going to be done anyhow; so, you know, we can say no. When I hear us use the word compromise, we are not compromising our abilities, our customs, nothing. What we are compromising are those things that we have no control over. So, if we can say that we shoot for the moon and fight as much as we can--but no [we couldn't stop the project]. I would never sign a document that a hundred years from now, my ancestors could look back and see my name and see that I went along with something willingly and believed in it. No. If that document explains how much I was against it [the project] and thoroughly explains why these things are. You know, everyone of our great chiefs of the Indian people of all times that gave in over [their] choice. They watched their tribes being slaughtered, but they got away with saving some of their lives. They didn't have a choice. Those men were great warriors and great believers of nature and those things that we stand for. To me, being an Indian is a way of life.

The group discussed how to best present their goal of protecting all things and, if this was not possible, to protect some things, i.e. to engage in cultural triage. The group agreed to a general outline for presenting their recommendations to the Department of Energy:

We should state, that because of these reasons, we oppose the project and, also, because of these reasons we are working this thing out. We are not compromising anything, we are not giving away our culture, we are not giving up our claim to the land, and these are the reasons why we do not want the ground disturbed. Say to the DOE that if you go against these desires, if you override that, if you use your power and override our

feelings, then this is what we want you to do to protect our resources,

The resolution, along with recommendations that reflect both holistic conservation and cultural triage statements, generated as a result of the meeting of the 16 involved tribal leaders, are presented below.

Resolution

The 16 Native American tribes involved in the Nevada Nuclear Waste Storage Investigations (NNWSI) project (currently referred to as the Yucca Mountain Project) strongly oppose the placement of a high-level radioactive waste disposal facility in the Yucca Mountain site due to the fact that the site is within the ancestral territories of certain Native American tribes or organizations, and due to possible hazardous ramifications such a facility may pose to the health and welfare of all people through contamination by any means.

Recommendations

In the interest of cultural preservation, we recommend the following actions. These recommendations do not in any way limit past, present, or future claims by any of the 16 involved tribes on any lands in the central or southern Nevada area, or past, present, or future claims on cultural resources that are located on these lands.

Recommendations on Native American artifacts (ranked in order of preference):

1. Leave the artifacts in place. Any site characterization activity that is located in an area which contains artifacts or an activity that uncovers artifacts by accident should be moved to another location.
2. Any artifacts that have been removed by archaeologists or others should be placed in a museum built and funded by the DOE, and operated by Native American people. Possible locations for this new museum include Death Valley, Ash Meadows, and Las Vegas.

Recommendations on Native American plants (ranked in order of preference):

1. Plant species identified as important to Native American cultures and religions should be avoided and/or protected from all site characterization activities.
2. In the event that a particular stand of any plant identified as important to Native Americans cannot be avoided or protected, then a similar stand of the same species located somewhere else should be preserved. Native American people should be granted access to this area at any time they choose.
3. If a similar stand of plants cannot be found, then the plant species should be transplanted to a similar environmental habitat, with adequate funding and study to insure that the plant species transplanted survives in the new location.

Recommendations for petroglyphs and pictographs:

Petroglyphs and pictographs have been discovered in several different locations in the cultural resources study area. Due to the relatively immovable nature of petroglyphs and pictographs, they, *along with the area in which they are located*, should be avoided and made off-limits to all Yucca Mountain Project personnel. When appropriate, these areas should be documented for inclusion in the National Register of Historic Places.

Recommendations for Native American burials:

1. Native Americans own all burials of Indian people. Because it is the right and duty of Native American people to make any decision concerning an Indian burial, the 16 involved tribes should be notified immediately and all work stopped upon the discovery of any burials during site characterization activities. The 16 involved tribes strongly recommend that any burial found during site characterization activities be left completely

undisturbed. Any site characterization activity at the location should be moved somewhere else.

2. If the 16 involved tribes decide that a known burial cannot be protected from vandalism or destruction, then the tribes will select a mutually suitable burial location for the reburial of the remains.

Recommendations about animals:

All site characterization activities should be kept away from known animal habitats. In the event that new animal habitats are discovered during site characterization activities, these new habitats should also be made off-limits to site characterization activity.

Recommendations about sacred areas:

The Native American representatives who visited the cultural resources study area in 1987 identified places of religious and/or historical importance to Native American people. Since it is impossible to move a "place," such as a spring, these sacred areas should be completely avoided. Any site characterization activity that is to occur at one of these locations should be moved to a different location.

Recommendations about information dissemination:

Each of the 16 involved tribes should receive copies of all archaeology reports written by the archaeology contractors who have worked, are currently working, or will work in the future, on any land connected with the Yucca Mountain Project. These reports should include but not be limited to, those published as public documents and those published as interim reports for the DOE.

Recommendations about Native American consultants:

Three Native American consultants should be hired as functional working members of all archaeology survey and/or excavation crews active on any land connected with the Yucca Mountain Project. These Native American consultants should be full-time, salaried employees, paid out of

existing and future Yucca Mountain Project funds. These Native American consultants will be responsible for issuing separate reports about any activity they are involved in. These reports will be transmitted to the tribal councils of the 16 involved tribes, as well as the DOE. In order to facilitate the transmittal of these reports, an independent budget and secretarial help will be provided from existing and future Yucca Mountain Project funds.

Recommendations about future studies:

The 16 involved tribes recommend that due to the religious and social sensitivity of the cultural resources already identified in the Yucca Mountain region, and the short timeframe Native American people have been allowed to respond to site characterization activities, further study and discussion should be conducted concerning the Yucca Mountain Project. This study and discussion should include, but not be limited to, history, archaeology, plant studies, cultural anthropology, and socio-economic issues pertinent to the 16 involved tribes.

APPENDIX A SUMMARY OF METHODS AND EFFORT

This appendix summarizes the methods utilized in the course of the Native American cultural resources study component of the Yucca Mountain Project. The chapter is divided into four sections that reflect the methods and effort for each of the major project tasks: (1) Native American interpretation of archaeological resources, (2) literature search and ethnohistory of Native American occupancy and use of the Yucca Mountain study area, (3) Native American use of plant resources in the study area, and (4) Native American recommendations for the disposition of cultural resources. For each section there is a summary of the methods employed in conducting the task, a chronological summary of field work, and a discussion of formal interaction with project participants during each task. A cumulative tabulation of formal interactions for the entire study effort is discussed as the final section of the chapter. Each of these sections are summaries of more detailed discussions presented in a series of three previous reports (Stoffle, Evans and Harshbarger, 1988; Stoffle, Olmsted and Evans, 1988; Stoffle, Evans and Halmo, et al. 1988).

For each major study task (except the literature review, which involved a different series of steps) the team employed a series of ten methodological steps for consulting with Indian people and identifying cultural values associated with their cultural resources. These generally included: (1) searching the specialized literature, (2) contacting official Native American representatives, (3) appointing and collaborating with Official Tribal Contact Representatives (OTCRs), (4) conducting key cultural expert interviews, (5) on-site visits with key cultural experts and/or OTCRs, (6) integrating and evaluating findings, (7) analyzing data, (8) drafting a report of findings, (9) submitting the report for review and comment by the involved Indian Tribes, and (10) finalizing the report. These procedural tasks have been previously described in detail (Stoffle et al., 1981; Stoffle, Evans and Harshbarger, 1988:18-25).

Task One: Native American Interpretation of Archaeological Resources

Project Start-Up and Initial Consultation

The tribal contact procedure for the Yucca Mountain cultural resources project involved three major ethnic groups: the Owens Valley Paiutes, the Western Shoshone, and the Southern Paiutes. Encompassed in these three ethnic groups are 13 federally recognized Indian tribes (see Table 1). During the course of the project, the Colorado River Indian Tribes (CRIT) reservation was added to the list because of the large Chemehuevi population currently enrolled there. Each of these 14 tribal groups were first contacted by letter. Tribal Contact Letter #1 described the project, the initial work schedule, and requested permission to proceed with a presentation about the cultural resources project to the tribal councils. In all cases this letter was followed by several telephone calls, during which more information about the project was given to the chairperson or tribal council. An initial presentation schedule was also formulated during this series of telephone calls.

The first choice with regard to the face-to-face contacts was to make a presentation to the tribal council or some subset of the council at a regularly scheduled council meeting. Due to scheduling conflicts and time constraints (some councils hold meetings weekly, others hold meetings monthly), only 10 of 14 presentations were made to full tribal councils. The remaining four presentations were made to the tribal chairperson and one or more council members. At the end of each presentation the tribal council, or the chairperson (if the full council could not meet) were asked if they wanted to be involved in the Yucca Mountain project. Each of the 14 federally recognized tribes asked to be included in the Yucca Mountain project.

During the tribal presentations, maps, photographs, and slides supplemented oral presentations which described the Native American cultural resources project. Afterwards, much discussion took place and questions posed by the meeting participants were answered until they had a clear understanding of the proposed high-level nuclear waste repository site and their proposed role in the cultural resources study. Materials such as xerox copies of maps showing the Yucca Mountain region and cultural resources study area helped to clarify these issues.

A decision was made to include one non-ward status Indian group and one off-reservation Indian group in the Yucca Mountain project. The non-ward status group is the Pahrump Paiutes, who live 40 miles from Yucca Mountain and expressed concern for cultural resources in the area. The off-reservation Indian group is the Las Vegas Indian Center, in Las Vegas, Nevada. The Center currently has over 5,000 Indian people on its client list, a portion of whom expressed cultural concerns for the Yucca Mountain area.

Procedurally, both the Pahrump Paiutes and the Las Vegas Indian Center were treated in the same manner as the 14 federally recognized tribes. Both groups received Tribal Contact Letter #1, after which a series of phone calls were made to schedule presentations. In the case of the Pahrump Paiutes, a face-to-face presentation was made to the Pahrump chairperson and four tribal elders. The Las Vegas Indian Center does not have a tribal council; however, it does have an Executive Board of Directors. A presentation was made to the Center's Executive Board, with the Director of the Center acting in the capacity of a "tribal chairperson." Both the Pahrump Paiutes and the Las Vegas Indian Center group asked to be included in the Yucca Mountain project.

All of the tribal councils agreed to appoint OTCRs. In some cases, the OTCR was the tribal chairperson; often someone else who expressed the willingness and had the time was appointed. After the OTCRs were appointed, they became the points of contact with the 16 tribal groups.

Chronology of Effort

A one-day orientation session was held in Las Vegas, Nevada on September 9, 1987 for all of the OTCRs. During the first part of this session the discussion focused on better understanding the Department of Energy's high-level radioactive waste repository proposal and the reasons for the Native American cultural resources study. During the second part of the session the discussion focused on explaining the coordination responsibilities of the OTCRs and planning the first site visit to Yucca Mountain.

The key cultural expert interview phase of the Yucca Mountain project began on August 4, 1987, and concluded on September 24, 1987. A total of 41 interviews were completed during this time. A two-team approach facilitated the practice of conducting interviews with cultural experts of one tribal group while simultaneously interacting with other

tribal groups. The ethnographic interviews usually took place in the homes of cultural experts and lasted from one to seven hours.

Key cultural experts who agreed to participate in the study were provided with a descriptive presentation similar to that provided for the Councils. Key cultural experts were asked a range of questions about the study area, the cultural resources project, their family connections to the study area, and people who used to live in the region. The interviews provided a preliminary identification of the cultural resources we could expect to find in the study area and helped us ascertain which tribal members could best identify cultural resources during the first site visit.

A total of 37 people made site visits, representing 15 of the 16 involved tribes. This effort produced a total of 73 cultural resource identification person-days over a 10 day period from September 28, 1987 to October 3, 1987, and from December 1, 1987 to December 4, 1987. The study area consists of over 70,000 acres of land, some parts of which are more accessible than other parts. Because it was impossible to see this much acreage in a short time period, two site visit routes were chosen as a beginning. The routes were designed to show examples of archaeology sites identified by the archaeologists working at Desert Research Institute in Reno, Nevada. One of the routes was in the area viewed by SAIC as being the initial area of site characterization activities, and was easily accessible by elders who for health reasons were not able to move around easily. The other route traveled up Fortymile Wash, with good examples of habitation sites and lithic sites along the way. This route was less accessible than the other route, and required four-wheel drive vehicles. Some of the sites along this second route also were not as accessible as those along the first route.

Three of the 16 involved tribes (Moapa, Benton, and Bishop) were unable to participate in the first scheduled site visit and two tribes (Duckwater and the Las Vegas Indian Center) were not able to send their key cultural experts. The Moapa people were confronted with the death of a tribal member just before the site visit—the Moapa representatives were actually in Beatty, Nevada preparing for the visit when they learned of the death. Duckwater and the Las Vegas Indian Center had scheduling conflicts with the site visits, but were able to arrange for one tribal member to visit the sites. Benton and Bishop had scheduling problems and could not send a representative.

A second site visit was conducted for those groups who could not participate in the first visit. This second visit occurred from December 1,

1987 to December 4, 1987, with four tribal groups (Moapa, Bishop, Duckwater, and the Las Vegas Indian Center) participating. During this second site visit, seven new sites surveyed by the DRI archaeologists were visited, in addition to one site included from the first site visit period. This second site visit was much more focussed due to the information learned during the first site visit.

Biweekly, the key cultural expert interview tapes were sent back to the home office for transcription by the project secretary. Transcriptions were then made available for integration with other fieldnotes upon the return of the study team. A preliminary interaction analysis was updated daily in the field. Findings from the literature search were already available, both as a document earlier submitted to SAIC, and as information organized chronologically in the project files. Individual fieldnotes were typed and organized by site and cultural interpretation. The construction of an electronic cultural resource data base was also begun during this integration and evaluation phase.

A preliminary summary of the first site visit findings was prepared at the request of SAIC in October, 1987. This summary contained brief discussions of the field activities and the major cultural resource findings derived from the on-site visits. A copy of this preliminary summary was sent to each of the OTCRs and tribal chairpersons of the 16 involved tribal groups. Subsequently, a draft report of findings was submitted to each of the tribes for review. The report was submitted in February 1988.

Task Two: Literature Search and Ethnohistory

The literature review examined four major categories of documents: (1) early traveler reports, (2) government documents, (3) ethnographic and historical documents, and (4) newspapers. Archival materials were supplemented by field interviews with several key historical informants.

For each category of documents, the first step in the analysis was an effort to ascertain the extent of available materials in each of these categories. Then a non-random sample of documents were acquired in order to assess the quality of data available in the different types of sources. Finally, a subset of documents, usually stratified by time period, were intensively searched for data.

Early traveler reports were examined from the 1820s, when the first known Euroamericans entered the region, through the time when Euroamerican settlement began.

Government documents examined and analyzed included reports of early government reconnaissance expeditions; annual reports of the Nevada Indian Agents; court documents at the Nye County Courthouse in Tonopah; the United States Census detailed census enumerations for southern Nye County for 1900 and 1910; reports of the U.S. Geological Survey and the Nevada Bureau of Mines; documents prepared jointly by the B.I.A. and the Soil Conservation Service in the 1930s; and planning studies, cultural resource surveys, and archaeological surveys for the study area and the surrounding region.

Ethnographic and historical documents consulted included a wide range of both published materials and unpublished manuscripts concerning the history of farming, ranching, mining, and railroads in the region, as well as research by anthropologists. Photograph collections comprised an important subcategory of ethnographic and historical documents that yielded considerable useful documentation.

Time-consuming searches through scores of reels of microfilm of local newspapers from Southern Nevada provided some of the most detailed information for the study area.

Chronology of Effort

The literature review was begun on June 22, 1987. The first phase of the effort relied upon sources already in the files of the research team; sources in the University of Michigan libraries; and sources obtained via the interlibrary borrowing service from collections in Nevada. During this time contact was made with several archives in Nevada and plans were developed for a period of intensive archival fieldwork. Beginning April 29, 1988, the project historian spent eleven days in Nevada, carrying out archival research at the University of Nevada Reno, the Nevada Historical Society in Reno, the Central Nevada Historical Society in Tonopah, the Nye County Clerk's Office in Tonopah, and Beatty School in Beatty. During this period of fieldwork, the project historian also conducted interviews with several key historical informants in Beatty and Tonopah. The historian also conducted two days of archival field research while in the Los Angeles area in early June, 1988 -- searching materials at the University of California Los Angeles, The Seaver Library of Western History, and the National Archives Regional Center in Laguna Niguel, California. Beginning in mid May 1988, after the archival field work in

Nevada, effort focused on writing up the literature review and ethnohistory, which was submitted in July 1988.

Task Three: Native American Plant Resources

The ethnobotanical fieldwork and on-site visits as part of the Yucca Mountain Project Native American cultural resources study were conducted between March 28 and April 14, 1988. In addition, a series of on-reservation interviews were conducted with tribal elders and plant experts between June 20 and June 29, 1988.

Each of the sixteen involved tribes were asked to appoint one or more individuals whom they recognized as being knowledgeable experts in the area of traditional plant use. These plant experts were chosen either by the tribal chair, the tribal council, or the Official Tribal Contact Representative (OTCR) (Stoffle, Evans, and Harshbarger 1988:21) for each of the 16 involved tribes. The ethnographic study team made this request in a tribal contact letter dated February 5, 1988.

A total of 32 Native American plant specialists were subsequently scheduled for participation in the ethnobotanical fieldwork and on-site visits. Unfortunately, because of transportation problems, illness, or other factors, seven of the individuals were not able to participate. Three additional members of the Pahrump Paiute Tribe were present during one site visit at Ash Meadows; two were not formally interviewed regarding plant resources, but were consulted on an informal basis during the visit. Moreover, an additional 12 Indian plant experts were interviewed during the June on-reservation interview period. A total of 40 Native American plant specialists were thus interviewed overall.

Staff members at EG&G Energy Measurements, Goleta, California, SAIC staff, and the principal project ethnographer developed an itinerary for each of the site visits at a planning meeting held in Las Vegas on March 7, 1988. This itinerary was influenced by concerns expressed by Native American representatives who participated in the earlier site visits to Yucca Mountain that certain sites be re-visited because of their identification as being important.

Key cultural experts felt that not enough time had been spent in identifying and interpreting the cultural resources at certain locations during the fall 1987 site visits. They expressed a desire that those sites be re-visited during the ethnobotany study, along with other areas which had not been visited because of time and other constraints during the fall.

Project botanists identified sites with more or less ideal combinations of plants in association with one another; ethnographers selected sites based on concerns expressed by key cultural experts and previous studies which identified microenvironmental habitats traditionally used by Native American peoples in the region. It was thus decided that at least seven of the sites would be re-visited, along with new sites selected by both project botanists and ethnographers.

In all, twenty-three sites were selected; during the actual fieldwork, however, some of the sites were excluded because of time constraints and other factors, most notably the concentrations of plants at certain sites and the desires of both Native American plant experts and project ethnographers to remain for longer periods of time at particular sites. It was felt that more in-depth information could be generated as a result of spending additional time at certain sites. Instead of visiting each of the twenty-three "original" sites, then, project ethnographers divided five of the sites into components, such that a total of twenty-three sites was actually visited.

Chronology of Effort

The ethnobotanical fieldwork and on-site visits constituted perhaps the most extensive, in terms of time, and intensive, in terms of effort, work task performed during the study. The ethnobotany work commenced on March 28, 1988. On March 27, project ethnographers flew to Las Vegas and made final field arrangements with the Project Manager at SAIC offices. The team then drove to Beatty, which served as the "base camp" for the ethnobotanical study.

Three representatives of the Timbisha Shoshone Tribe of Death Valley, California, visited the low elevation zone site at Dune Wash on March 28 and three middle elevation zone sites which comprise the Prow Pass Ceremonial Area on March 29. On March 30, two representatives of the Bishop community of Owens Valley Paiute, along with a Chemehuevi plant expert and basketmaker from the Colorado River Indian Tribes reservation in Parker, Arizona, visited two middle elevation zone sites in the Fortymile Canyon area. On March 31, these individuals visited two low elevation zone sites west of the Nevada Test Site at Black Cone in the Crater Flats Area, and at Tarantula Canyon. During the following two days (April 1 and 2), one representative from the Pahrump Paiute Tribe and two individuals representing the Owens Valley Paiute people

in Fort Independence, California, visited the low elevation zone sites at Cane Spring and Ash Meadows.

The following week, the Dune Wash and Prow Pass Ceremonial Area sites were visited by representatives of the Las Vegas Indian Center and the Chemehuevi Tribe in California (April 4 and 5). The second two-day sequence (April 6 and 7) consisted of visits to Tarantula Canyon and Black Cone by representatives from the Las Vegas Colony. During the next two days (April 8 and 9), plant specialists from the Moapa Paiute Tribe, along with representatives of the Las Vegas Indian Center and the Pahrump Paiute Tribe visited the Cane Spring and Ash Meadows sites.

During the third week (April 11 to 14), two representatives from the Lone Pine community of Owens Valley Paiute, the tribal chairman from the Yomba Shoshone reservation, two elders from the Paiute Indian Tribe of Utah and two representatives of the Kaibab Paiute Tribe visited the middle elevation zone sites of Tippetah and White Rock Spring, as well as the high elevation zone site atop Rainier Mesa. The Lone Pine and Yomba representatives also visited Captain Jack Spring.

Following a preliminary analysis of the data generated during the on-site visits, project ethnographers returned to Las Vegas to interview additional members of the urban Las Vegas Indian Center, as well as elders and plant experts who were unable to participate in the earlier on-site visits. Most of these individuals were recommended by participants in the on-site visits as being very knowledgeable about plant resources and their uses. Moreover, many respondents contacted during the on-reservation interviews were members of ethnic/tribal groups which the preliminary analysis of on-site visit data indicated were under-represented. Project ethnographers thus decided that the on-reservation interviews should focus on members of the Las Vegas Indian Center and Western Shoshone tribal groups involved in the project.

On June 19, 1988 the principal ethnographer departed from Las Vegas for Kaibab, Arizona to pick up the Native American research associate, an elder of the Kaibab Paiute Tribe who has a long association with the team as well as extensive experience in cultural resource assessment studies. He accompanied the ethnographers during the trip to the various reservations in Nevada and California. Upon returning to Las Vegas on June 20, they met with the other project ethnographer, who arrived that afternoon. The following day, they contacted the Executive Director of the Las Vegas Indian Center to schedule potential interviews with Center members. The ethnographic team was subsequently invited to

attend a board meeting of the Indian Center that evening. After presenting a brief update on the Yucca Mountain project to Center board members, the ethnographers were given the names and addresses of two individuals who expressed an interest in being interviewed. The ethnographic team was also invited and given approval to conduct interviews during a meeting of the Native American Women's Association the following week.

On June 22, a Hopi member of the Center was interviewed in her home during an instructional basket-making class, which was led by two members of the Moapa Paiute Tribe and attended by urban Native American women interested in learning the craft. Later that afternoon, ethnographers interviewed an Oto-Missouri woman member of the Las Vegas Indian Center and the Native American Women's Association at the tribal offices of the Las Vegas Paiute Indian Colony.

On June 23, the ethnographers and the Native American research associate departed for Bishop, California. Enroute, they stopped at Lone Pine, California to interview an elderly Western Shoshone woman from the Timbisha Tribe, whose relatives live there. The interview began in the late afternoon and concluded in the early evening. The following day (June 24), the ethnographers spent an intensive 5 hours interviewing 2 Western Shoshone individuals who reside in the Lone Pine Indian community and then returned to Bishop. On June 25, the ethnographers travelled to Fort Independence and interviewed an Owens Valley Paiute elder. Following that interview, the team headed on their way to visit the Yomba Shoshone reservation. A heavy hail storm in Lee Vining, California late that afternoon forced the team to overnight there, however.

On the morning of June 26, the ethnographic team departed for Yomba and arrived there early in the afternoon. They met with the tribal chairman for approximately one hour. Unfortunately, plant specialists recommended earlier by the chairman had left Yomba to visit relatives. Consequently, no interviews were conducted at Yomba. The chairman was updated on the status of the study before the team departed for the Duckwater Shoshone reservation.

After spending the night in Eureka, Nevada, the ethnographers travelled to Duckwater on the morning of June 27. There they met with a member of the Environmental Protection Committee of the Western Shoshone National Council to discuss the project before interviewing a Duckwater elder about traditional plant resources. After having completed the interviews, the ethnographers departed for Kaibab, Arizona to drop

off the Southern Paiute elder. The next morning (June 28), one ethnographer interviewed him on plant resources and their uses while the other visited with the tribal chairperson and OTCR, updating them on the project. After an intensive, 5 hour interview, the ethnographic team departed that afternoon for Las Vegas. Upon arriving, they proceeded to the Las Vegas Paiute Indian Colony to attend the meeting of the Native American Women's Association discussed earlier. After a presentation regarding the nature and scope of the Yucca Mountain project, the ethnographers interviewed a total of 4 Native American women - 3 of them urban residents, 1 a member of the Las Vegas Colony - concerning contemporary uses of plants. The interviews lasted 3 and one-half hours. On June 29, the ethnographers left Las Vegas and returned to Ann Arbor to analyze the new data generated from the on-reservation interviews. All interviews were conducted with the approval and consent of the respondents, tribal chairs, or other tribal officials.

In-Field Logistics and Rationale

Prior to beginning the ethnobotanical fieldwork in March, the study team ethnographers set out a strategy for conducting the ethnobotany on-site visits. It was decided that each ethnographer would be responsible for "tracking" one Native American plant expert over each two-day period. It was assumed that this type of approach would more readily facilitate rapport with the individual and allow more in-depth interaction. In a few instances, however, ethnographers interviewed two plant specialists simultaneously, with one serving as respondent and the other as interpreter. In cases where both plant specialists were respondents, this was made explicit in the field notes.

Once in the field, it was decided that plant identifications and interviews would proceed in a three-tiered fashion. First priority would be given to the Native American plant expert; that is, plants which he or she identified first were the object of the interview. Second priority was given to plants which were identified by other Indian people, i.e., a plant specialist who was not any one ethnographer's "key consultant" or who was not being interviewed by one of the study team ethnographers at that particular time. Only after plant identifications by the Native American plant experts were assumed to have ceased and subsequent interviews were complete did the project botanists and ethnographers themselves begin to identify plants and ask the Indian plant specialists about them.

Upon arriving at each site, the ethnographers and their key consultant/plant expert dispersed to separate, somewhat "isolated" areas of the site in order to provide respondents with maximum privacy during the in-depth interview process. This strategy was also employed for the dual purpose of restricting coloration of data to the maximum extent possible. In a few cases, this strategy proved unsuccessful; in several others, however, two respondents in close proximity to each other actually stimulated one or the others' memory concerning plant names and uses.

In order to prevent any identifications being missed, project botanists provided the ethnographers with colored flagging material. Because there was only one botanist dividing his or her time between three ethnographers and their respondents, it was often difficult for them to be at each ethnographer's side to verify a scientific identification. For this reason, the ethnographers tagged each plant for which they conducted an interview in the absence of the botanist; at the end of the time spent at that location, tagged plants were pointed out if the botanists had not been able to catch up and provide positive scientific identification. When all plants had been positively identified to the extent possible, flags were removed to prevent leaving clues as to previous Indian identification. The purpose of this strategy was to encourage independent Native American plant expert identification and also to reduce coloration. In a few cases where plants could not be positively identified in the field due to the earliness of the season, climate, or other factors, plants were left tagged for future reference and positive identification by the botanists.

Voucher specimens were collected by the botanists for each of the plants identified and for which interviews with the Native American plant specialists were conducted. In the event scientific identification of a plant could not be provided by the botanists in the field, one of two options was exercised—either parts of the plant were collected and examined closely under the microscope in the lab, thus providing tentative identification, or it was not collected immediately but rather marked for future collection and identification.

Only one specimen was collected for each species identified. That is to say, if the Native American plant expert identified the same plant twice in the same day (whether at the same site or at two different sites) or more than once during the two-day sequence of visits, it was assumed that the same information derived from the first interview could simply be extrapolated to all other subsequent interviews with that individual (i.e., the data would not differ).

During the on-reservation interviews, ethnographers carried with them the dried voucher specimens, which were obtained from the Herbarium at the University of Nevada-Las Vegas. The strategy for the on-reservation interviews was to run through the set of the 76 plants with each respondent; for each species which he or she identified, the same series of questions were asked about each plant as were asked during the on-site visits. It was assumed that visual association with an actual specimen of the plant would stimulate the memories of on-reservation plant experts.

Each of the strategies had its drawbacks. The on-site visit methodology provided Native American participants with an opportunity to observe and identify plants in their natural ecological context. Unfortunately, none of the on-site participants were able to visit all of the ecozones and sites; therefore, they were not able to identify all of the potentially identifiable species of plants. Conversely, the on-reservation strategy of showing respondents dried voucher specimens of the plants provided them with an opportunity to observe each of the 76 species which were identified in the field. Unfortunately, on-reservation respondents were unable to observe and identify the plants in their ecological context. Additionally, the voucher specimens prevented respondents from using smell as a technique of identification. Also, the dried and pressed voucher specimens made respondents unsure about positive identification in some instances. On the whole, however, the project ethnographers felt that both strategies were successful.

For each plant identified by a Native American plant expert, both in the field and on-reservation, a variety of questions were asked. The range and categories of questions were developed by project ethnographers prior to the fieldwork. In consultation with the Native American research associate, these categories and questions were refined based on his extensive knowledge of traditional plant use. The first question attempted to elicit the Indian name for the plant. The next questions attempted to get at indigenous categories of plants (e.g., trees, grasses, plants with berries). Cognitive categorization questions were asked about the variety or kinds of each particular plant identified and how it could be distinguished from other species of the same plant as well as different species. Additional questions revolved around the issues of traditional and current use by both the ethnic group as perceived by the respondent as well as a personal (family) use history. Questions about purpose of use (food, medicine, etc.) and frequency of use by gender were also asked.

Further detail on the use of certain plant parts for specific purposes was also recorded. Questions were asked regarding the time of year in which the part(s) used were harvested and used, how they were harvested and prepared, quantity of plants or parts harvested, and whether there were any harvest techniques, methods of propagation, cultivation, or management techniques employed by both the respondent or the ethnic group, past and present, to ensure a stable, reliable, or increased supply of the resource. In order to understand the process of cultural knowledge transmission, questions were asked about whether the respondent had been or was currently involved in teaching traditional cultural knowledge about plants and their uses to relatives, peers, or other members of the ethnic group, particularly the second and third generations. Finally, the Native American plant specialists were asked to provide recommendations regarding the disposition of each plant which they identified in the event potentially adverse effects were caused by site characterization activities in the area where the plants were present.

Task Four: Native American Recommendations for the Disposition of Cultural Resources

Chronology of Effort

Discussions about how to best minimize any potential adverse effects on cultural resources caused by site characterization activities were begun with representatives of the 16 tribes in March 1988. Due to the long distances between the tribes, three separate meetings were scheduled: one in Las Vegas, one in Bishop, California, and one in Duckwater, Nevada. Representatives from the 16 involved tribes were invited to attend whichever meeting they preferred. In all cases, the representatives chose the meeting that was closest to their home.

The first of these meetings was held on March 17, 1988, in Las Vegas, Nevada. Seventeen people, representing seven of the 16 involved tribes attended this meeting. Two more meetings were held on March 19, 1988: one in Duckwater, Nevada, and one in Bishop, California. Five people, representing two of the involved tribes, attended the meeting in Bishop. Due to a misunderstanding, the meeting place at the Duckwater Tribal office was closed on March 19, 1988. However, the principal ethnographer met personally that day with the representative from Yomba, who came to Duckwater for the meeting. During the same

weekend, the principal ethnographer met with three members of the Duckwater Indian Tribe, including the chairman.

During early April, project ethnographers made telephone calls to each of the 16 involved tribes requesting that they send representatives to a meeting in Las Vegas, scheduled for early May. Due to the sensitive nature of the topics that were planned for this meeting, each tribe was asked to send their chairperson and a tribal council member. Originally, the meeting was scheduled to be two days long, but it was impossible to coordinate due to busy tribal administrative schedules. The meeting was shortened to one day in length, and scheduled for May 5, 1988. This change was noted in a Tribal Contact letter dated April 18, 1988.

The preliminary comments from the three meetings held in March were compiled into one document, along with comments made by tribal representatives during the ethnobotany site visits conducted in March and April. This document was included with the April 18, 1988 Tribal Contact letter.

A total of 33 representatives, from 14 of the 16 involved tribes, attended the May 5, 1988 meeting in Las Vegas. The preliminary recommendations made at the earlier meetings were discussed, and in some cases rewritten to reflect new ideas. By the end of the meeting, everyone present was given a copy of their recommendations so that they could discuss the recommendations with their tribal councils and tribal members. The document was submitted to SAIC in May 1988.

Formal Interaction Analysis

Formal interaction analysis charts the progress and direction of consultative study designs, such as the cultural resources project (Stoffle and Howell 1986). Study team members have documented five kinds of formal interactions: (1) letters, (2) phone calls, (3) personal contacts, (4) interviews, and (5) site visit contacts. Personal contacts are distinguished from interviews by the direction of the flow of information. During personal contacts, such as tribal presentations, ISR researchers provided project information to council members. During interviews, the Indian people and other key informants provided the ISR study team with information. Site visit contacts represent the person days spent on-site in the Yucca Mountain area.

In Tables A.1 through A.5, the five kinds of interactions are tabulated for each of twenty-four groups or categories of contacts. These twenty-four categories include: (A) each of the sixteen tribes; (B) four categories of sources of data for the literature review, including (1) Libraries, (2) Government Archives, (3) Authors and Publishers, and (4) Key Historical Informants; and (C) four categories of administrative and professional interactions; (1) Contractors, (2) Project Personnel, (3) Administrative, and (4) Other Project Contacts.

Since each interaction is vital to the organization and implementation of the cultural resource study, it is difficult to assign a rank or weight to each of the five kinds of interactions. For the purposes of this summary, we have made no attempt to weigh or rank the interactions. The total number of interactions is presented as a simple sum of the five types.

A total of 2,699 interactions were recorded in the time period June 1, 1987 to October 15, 1988. Of this total, 1,748 were with the sixteen tribes or their representatives, 94 were with archivists for the literature review, and 857 were with contractors (SAIC), project personnel, administrative people, and other project contacts. The bulk of these interactions were phone calls (1,212), of which more than half (632) were made to the tribes or their representatives.

Table A.1 summarizes the number of interactions for the archaeological resource interpretation work. Table A.2 summarizes those formal interactions which occurred during the literature review and ethnohistory work. Table A.3 documents the interactions during the ethnobotanical work, and Table A.4 lists the number of interactions which occurred during the mitigation portion of the study. Finally, Table A.5 summarizes the total number of formal interactions for the entire work effort as of October 15, 1988.

Table A.1 NATIVE AMERICAN INTERPRETATION OF
ARCHAEOLOGICAL RESOURCES

Number of interactions - June 1, 1987, to December 10, 1987

	Contacts					Total
	Letters	Phone Personal	Interviews	Site Visit Person Days		
Kaibab	9	10	3	10	7	39
Paiute Indian tribe of Utah	11	10	7	2	5	35
Moapa	17	11	8	1	8	45
Las Vegas Paiute Colony	10	17	8	1	4	40
Las Vegas Indian Center	9	19	8	0	7	43
Chemehuevi	12	10	6	3	3	34
CRIT	8	11	12	7	6	44
Pahrump	6	13	4	6	1	30
Timbisha	13	15	7	0	8	43
Lone Pine	10	18	4	2	5	39
Ft. Independence	8	9	3	0	4	24
Big Pine	9	26	5	1	2	43
Bishop	13	26	17	3	0	59
Benton	8	21	14	3	0	46
Yomba	10	8	6	2	3	29
Duckwater	14	21	2	0	6	43
SUBTOTAL	167	245	114	41	69	636
Contractors	27	93	15	0	28	163
Administrative	17	57	6	0	0	80
Project Personnel	33	47	N/A*	N/A	N/A	50
Other Project contacts	4	14	0	0	12	30
SUBTOTAL	51	211	21	0	40	323
TOTAL	218	456	135	41	109	959

* N/A = Not Applicable

Table A.2. LITERATURE REVIEW AND ETHNOHISTORY

Number of Interactions Literature Review - June 1, 1987, to July 18, 1988

	Letters	Phone	Personal	Contacts		Total
				Interviews	Site Visit Person Days	
Libraries and Historical Societies	11	24	0	0	9	44
Government Archives	1	10	0	0	1	12
Authors and Publishers	4	15	0	0	0	19
Key Historical Informants	0	12	1	6	0	19
SUBTOTAL	16	61	1	6	10	94
Contractors	0	3	0	0	0	3
Administrative	0	3	0	0	0	3
Project Personnel	0	2	0	0	0	2
Other Project contacts	0	1	0	0	0	1
SUBTOTAL	0	9	0	0	0	9
TOTAL	16	70	1	6	10	103

Table A.3. YUCCA MOUNTAIN ETHNOBOTANY

Number of interactions - January 1, 1988, to October 7, 1988

	Contacts				Site Visit Person Days	Total
	Letters	Phone Personal	Interviews			
Kaibab	7	32	4	49	13	105
Paiute Indian Tribe of Utah	6	7	0	18	4	35
Moapa	6	3	1	41	6	57
Las Vegas Paiute Colony	6	16	1	30	4	57
Las Vegas Indian Center	6	20	3	36	4	69
Chemehuevi	7	12	0	19	2	40
CRIT	6	24	1	10	2	43
Pahrump	7	14	2	33	5	61
Timbisha	9	22	3	26	6	66
Lone Pine	5	12	0	48	4	69
Ft. Independence	6	16	1	31	4	58
Big Pine	6	13	0	0	0	19
Bishop	7	18	0	12	4	41
Benton	5	6	0	0	0	11
Yomba	5	42	2	11	2	62
Duckwater	6	24	4	17	0	51
SUBTOTAL	100	281	22	381	60	844
Contractors	24	108	3	N/A*	13	148
Administrative	2	44	1	N/A	N/A	47
Project Personnel	19	73	6	N/A	70	168
Other Project contacts	21	28	2	N/A	N/A	51
SUBTOTAL	66	253	12	0	83	414
TOTAL	166	534	34	381	143	1258

* N/A = Not Applicable

Table A.4. NATIVE AMERICAN RECOMMENDATIONS
REGARDING THE DISPOSITION OF CULTURAL RESOURCES

Number of interactions - January 1, 1988, to October 15, 1988

	Contact				Site Visit Person Days	Total
	Letters	Phone Personal	Interviews			
Kaibab	8	9	4	-	3	24
Palute Indian tribe of Utah	6	8	0	-	0	14
Moapa	9	5	6	-	6	26
Las Vegas Palute Colony	7	7	4	-	N/A*	18
Las Vegas Indian Center	6	1	2	-	N/A	9
Chemehuevi	7	7	1	-	1	16
CRIT	8	10	2	-	2	22
Pahrump	5	2	1	-	1	9
Timbisha	6	6	3	-	3	18
Lone Pine	6	4	2	-	2	14
Ft. Independence	5	3	1	-	1	10
Big Pine	5	7	2	-	2	16
Bishop	8	12	2	-	2	24
Benton	5	5	1	-	1	12
Yomba	5	11	2	-	2	20
Duckwater	5	9	2	-	0	16
SUBTOTAL	101	106	35	-	26	268
Contractors	6	25	4	N/A	1	36
Administrative	-	7	N/A	N/A	N/A	7
Project Personnel	2	1	1	N/A	26	30
Other Project contacts	25	13	-	N/A	N/A	38
SUBTOTAL	33	46	5	N/A	27	111
TOTAL	134	152	40	N/A	53	379

* N/A = Not Applicable

Table A.5. FORMAL INTERACTIONS FOR TOTAL PROJECT
Cumulative Number of interactions - June 1, 1987, to October 15, 1988

	Contact					Total
	Letters	Phone Personal	Interviews	Site Visit Person Days		
Kalibab	24	51	11	59	23	168
Palute Indian tribe of Utah	23	25	7	20	9	84
Moapa	32	19	15	42	20	128
Las Vegas Palute Colony	23	40	13	31	8	115
Las Vegas Indian Center	21	40	13	36	11	121
Chemehuevi	26	29	7	22	6	90
CRIT	22	45	15	17	10	109
Pahrump	18	29	7	39	7	100
Timbisha	28	43	13	26	17	127
Lone Pine	21	34	6	50	11	122
Ft. Independence	19	28	5	31	9	92
Big Pine	20	46	7	1	4	78
Bishop	28	56	19	15	6	124
Benton	18	32	15	3	1	69
Yomba	20	61	10	13	7	111
Duckwater	25	54	8	17	6	110
SUBTOTAL	368	632	171	422	155	1,748
Libraries and Historical Societies	11	24	0	0	9	44
Government Archives	1	10	0	0	1	12
Authors and Publishers	4	15	0	0	0	19
Key Historical Informants	0	12	1	6	0	19
SUBTOTAL	16	61	1	6	10	94
Contractors	57	229	22	0	42	350
Administrative	19	111	7	0	0	137
Project Personnel	24	123	7	0	96	250
Other Project contacts	50	56	2	0	12	120
SUBTOTAL	150	519	38	0	150	857
TOTAL	534	1,212	210	428	315	2,699

APPENDIX B IMPLEMENTING REGULATIONS

The American Indian Religious Freedom Act does not require that specific implementing regulations be promulgated by any agency. Rather, it requires that agencies review their policies and procedures in view of the federal policy supporting American Indian religious freedom.

In August 1979, the Department of Interior published the report on agency internal reviews required by the Act (American Indian Religious Freedom Act Report, Federal Agencies Task Force, Cecil D. Andrus, Chairman, August 1979.) Section IIC2, containing the summary statement on DOE policy, is shown below:

For purposes of the Inter-agency Task force on Indian Religious Freedom, the Department of Energy (DOE) has identified the protection of sacred sites as a potential problem area during the evaluation of procedures required in the American Indian Religious Freedom Act. To avoid in a systematic manner future religious infringements, the DOE is considering as a possible approach the following process, either as a regulation or as an internal issuance.

The DOE is interested in seeing that the free exercise of religion is protected efficiently without setting up an unnecessarily cumbersome mechanism. Therefore, it seems likely that the process will be integrated into the environmental review process which is already established, perhaps as part of the Environmental Impact Statement. The process would likely apply to both substantial involvement by DOE or direct authority for DOE's proposed activity which affects any specific site for which an environmental review is required.

Before the DOE would proceed with its proposed activity, an investigation would be made to ascertain if the site at issue is related to the religious rites or ceremonies or is a sacred site of any traditional religion which is currently being practiced by any American Indian, Eskimo, Aleut or Native Hawaiian.

If the investigation finds indications that the site is currently a subject of religious practices, then the Native traditional religious leaders shall be consulted, in order to determine whether the DOE proposed action would infringe on the free exercise of religion in any way and to gain an understanding of any impact on the Native American traditional religions. We foresee that the most difficult issue for the DOE will be whether its proposed alteration of a site would deny access to a sacred site or otherwise infringe on the free exercise of religion.

If consultation indicates that the proposed DOE action may infringe on the free exercise of religion, then alternate plans will be prepared with additional consultation with the Native traditional religious leaders. Alternate plans which do not infringe on the free exercise of religion will be examined to determine whether they adequately meet the goals of the DOE for the site.

The DOE will make all deliberate effort to adopt a course of action consistent with the policy enunciated in P.L. 95-341. We are very aware of the rulings of the United States Supreme Court that the Federal government may not abridge the free exercise of religion unless there is a compelling governmental interest at stake.

If no alternative is feasible and DOE finds upon consultation that its proposed action would deny the free exercise of religion, then the difficult question must be asked: How crucial is the project? To safeguard against the answer being made by the program people most intimately involved in the project, the finding will be made within the environmental review, as previously noted. Within the DOE the Assistant Secretary for Environment is structurally separate from the major program offices.

If the DOE's proposed action is deemed to be compelling, and must proceed, then the findings and justification would be

reviewed by the IR Secretariat, which includes the Indian Affairs Office. Then the findings and justifications, accompanied by the Inter-governmental and Institutional Relations report, will be forwarded to the Secretary for written approval before a final action is taken. Upon the Secretary's final approval, notice will be given. The findings and justification will be published and communicated to the native traditional religious leaders or other concerned parties.

In addition to the step-by-step procedures presented in the policy statement, DOE is preparing a Guidance Manual for DOE compliance with the Act. The manual will provide guidance for implementing the policy established by the Act and will provide specific information on:

- (1) understanding and rights and concerns of Native Americans, particularly with regard to federal energy projects.
- (2) accomplishing successful consultation with Native Americans under AIRFA; and
- (3) integrating AIRFA implementation with the requirements of other environmental laws and regulations, particularly the National Environmental Policy Act of 1969 (NEPA).

APPENDIX C
NATIVE AMERICAN RECOMMENDATIONS REGARDING
CULTURAL RESOURCES AND
POSSIBLE DEPARTMENT OF ENERGY (DOE) ACTIONS

Representatives of the U.S. Department of Energy (DOE) have consulted with Native American cultural and religious leaders for the purposes of (1) identifying traditional cultural values that are associated with cultural resources that may be affected by Yucca Mountain Project activities, and (2) obtaining Native American recommendations for mitigating adverse effects on cultural values and cultural resources. These consultations were undertaken pursuant to the American Indian Religious Freedom Act. Native American recommendations and possible DOE actions pursuant to these recommendations comprise the remainder of this report.

Consultations between DOE and the tribes involved in the cultural resource studies will continue throughout the life of the repository program to achieve the goal of mitigating adverse effects on the cultural values and cultural resources. The following possible DOE actions represent a starting point for continued discussions and consultations regarding tribal recommendations for achieving this goal.

NATIVE AMERICAN ARTIFACTS

Native American Recommendations

"Leave the artifacts in place. Any site characterization activity that is located in an area which contains artifacts or an activity that uncovers artifacts by accident should be moved to another location."

"Any artifacts that have been removed by archaeologists or others should be placed in a museum built and funded by the DOE, and operated by Native American people. Possible locations for this new museum include Death Valley, Ash Meadows, and Las Vegas."

Possible Action

For those artifacts collected on the Nevada Test site (NTS) in conjunction with the Yucca Mountain Project, DOE would make every effort to make artifacts available to Native American people. Specific techniques for implementing this policy would be developed in consultation with Native American representatives.

NATIVE AMERICAN PLANTS

Native American Recommendations

"Plant species identified as important to Native American cultures and religions should be avoided and/or protected from all site characterization activities."

"In the event that a particular stand of any plant identified as important to Native Americans cannot be avoided or protected, then a similar stand of the same species located elsewhere should be preserved. Native American people should be granted access to this area at any time they choose."

"If a similar stand of plants cannot be found, then the plant species should be transplanted to a similar environmental habitat, with adequate funding and study to insure that the plant species transplanted survives in the new location."

Possible Action

In consultation with Tribal representatives, DOE would add spiritually and culturally important plants to the list of plants in the Environmental Field Activity Plan for Terrestrial Ecosystems that are being monitored during pre-activity and post-activity surveys. DOE would send reports of pre-activity and post-activity biota surveys to the Native American representatives.

DOE would attempt to identify, in coordination and cooperation with the U.S. Department of Interior, Bureau of Land Management (BLM), a nearby, publicly accessible area that contains the spiritually and culturally important species of plants.

DOE will develop a Reclamation Feasibility Plan prior to implementing reclamation necessary as a result of site characterization

activities. Transplanting studies would be conducted as part of Reclamation Implementation Studies. DOE would study the feasibility of replanting and transplanting spiritually and culturally important plants, deemed feasible and in coordination and cooperation with BLM, DOE would replant or transplant these species in a nearby, publicly accessible area.

PETROGLYPHS AND PICTOGRAPHS

Native American Recommendation

"Petroglyphs and pictographs have been discovered in several different locations in the cultural resources study area. Due to the relatively immovable nature of petroglyphs and pictographs, they, along with the area in which they are located, should be avoided and made off limits to all NNWSI personnel. When appropriate, these areas should be documented for inclusion in the National Register of Historic Places."

Possible Action

The Yucca Mountain Project currently documents the existence of all discovered petroglyphs and pictographs in the Yucca Mountain area and recommends their inclusion in the National Register of Historic Places if they meet the criteria for historic significance, and avoids and protects such areas to the extent practicable. Petroglyphs and pictographs of spiritual significance to Native American people that do not meet the criteria for inclusion in the National Register of Historic Places would also be documented, avoided, and protected to the extent practicable. Documentation of petroglyphs and pictographs would be sent to the Native American representatives.

NATIVE AMERICAN BURIALS

Native American Recommendations

"Native Americans own all burials of Indian people. Because it is the right and duty of Native American people to make any decision concerning an Indian burial, the 16 involved tribes should be notified immediately and all work stopped upon the discovery of any burials during site characterization activities. The 16 involved tribes strongly recommend that any burial found during site characterization activities be left completely undisturbed. Any site characterization activity at the location should be moved somewhere else."

"If the 16 involved tribes decide that a known burial cannot be protected from vandalism or destruction, then the tribes will select a mutually suitable burial location for the reburial of the remains."

Possible Action

DOE would leave all burials undisturbed and would move any site characterization activity that threatens a burial, if at all practicable.

DOE would treat the entire burial and any artifacts found in association with the burial with the same treatment and respect.

DOE would stop all site characterization activity in the vicinity of a discovered burial and would notify the Native American representatives immediately upon discovery of a burial.

All site characterization activity in the immediate area of a discovered burial would cease for a fair and reasonable time until consultation with the Native American representatives is complete.

Disposition of the burial and associated artifacts would be determined on a case-by-case basis in consultation with the Native American representatives.

If the Native American representatives decide that a known burial cannot be protected from vandalism or destruction, then they may select a mutually suitable burial location and may rebury, with appropriate religious ceremonies, the remains in that location.

ANIMALS

Native American Recommendations

"All site characterization activities should be kept away from known animal habitats. In the event that new animal habitats are discovered during site characterization activities, these new habitats should also be made off-limits to site characterization activities."

Possible Action

In consultation with the Native American representative, DOE would include spiritually and culturally important animals in the list of species monitored in the Environmental Field Activity Plan (EFAP) for Terrestrial Ecosystems. This EFAP incorporates pre-activity surveys to determine the presence of important species, their sign, or their preferred habitat, and documents the presence of other biological resources. Mitigation strategies to avoid or minimize potential impacts to these resources will be recommended based on survey findings.

SACRED PLACES

Native American Recommendations

"The Native American representatives who visited the cultural resources study area in 1987 identified places of religious and/or historic importance to Native American people. Since it is impossible to move a 'place,' such as a spring, these sacred areas should be completely avoided. Any site characterization activity that is to occur at one of these locations should be moved to a different location."

Possible Action

DOE would avoid springs during land-disturbing activities associated with site characterization, if at all practicable. The manner in which site characterization activities are conducted would be changed to achieve this goal.

DOE would consult with the Native American representatives prior to conducting land-disturbing site characterization activities in the Prow Pass area.

INFORMATION DISSEMINATION

Native American Recommendation

"Each of the 16 involved tribes should receive copies of all archaeology reports written by the archaeology contractors who have worked, are currently working, or will work in the future, on any lands connected with the NNWSI Project. These reports should include, but not be limited to, those published as public documents and those published as interim reports for the DOE."

Possible Action

DOE would send all past and future Yucca Mountain Project archaeology reports to the Native American representatives.

DOE would send all past and future Yucca Mountain Project terrestrial ecosystems reports to the Native American representatives.

NATIVE AMERICAN CONSULTANTS

Native American Recommendation

"Three Native American consultants should be hired as functional working members of all archaeology survey and/or excavation crews active on any land connected with the NNWSI Project. These Native American consultants should be full-time, salaried employees, paid out of existing and future NNWSI funds. These Native American consultants will be responsible for issuing separate reports about any activity they are involved in. These reports will be transmitted to the tribal councils of the 16 involved tribes, as well as the DOE. In order to facilitate the transmittal of these reports, an independent budget and secretarial help will be provided from existing and future NNWSI funds."

Possible Action

DOE would notify the Native American representatives of all future pre-activity archaeology surveys related to the Yucca Mountain Project and the representatives or others designated by them would be invited to participate in those surveys.

FUTURE STUDIES

Native American Recommendation

"The 16 involved tribes recommend that due to the religious and social sensitivity of the cultural resources already identified in the Yucca Mountain region, and the short timeframe Native American people have been allowed to respond to site characterization activities, further study and discussion should be conducted concerning the NNWSI Project. This study and discussion should include, but not be limited to, history, archaeology, plant studies, cultural anthropology, and socio-economic issues pertinent to the 16 involved tribes."

Possible Action

Consultation regarding cultural resources relative to the Yucca Mountain Project will continue through ongoing interaction between DOI or DOE contractors and the Native American representatives.

APPENDIX D
PHOTOS OF SOME AMERICAN INDIAN PEOPLE
WHO PARTICIPATED IN THE STUDY



Photo 10. Belinda Lopez (Las Vegas Paiute) observing low elevation Indian plants and desert wildflowers south of Black Cone.



Photo 11. Lila Carter (Las Vegas Paiute) discussing the desert tortoise, a sacred animal among Southern Paiute people.



Photo 12. (From left) Louella Tom, Lalovi Miller and Herbert Meyers (Moapa Paiute) and Rich Stoffle examining an obsidian flaked point.



Photo 13. Effie Smith (Las Vegas Indian Center) holding Paiute ceramic sherds found at the Trigger Trap Bundle site.



Photo 14. Chemehuevi elder and plant specialist Mary Lou Brown (CRP) discussing uses of Indian tea (*Ephedra* sp.) a traditional medicinal plant.



Photo 15. Charles Smith (Chemehuevi) interpreting a circular rock ring formation at the Twin Springs site.



Photo 16. Western Shoshone elder Ted Shaw (Duckwater) discussing the use of a grinding slab found in Prow Pass Ceremonial Area.



Photo 17. Boyd Graham (Duckwater) beside stone pestle and rock cairn at Prow Pass Ceremonial Area.



Photo 18. Bobbie Chavez (Bishop) and Lana Decker (Bishop) discussing uses of greasewood or creosote bush (*Larrea tridentata*), a traditional medicine plant.



Photo 19. Levi Hooper (Yomba) and ethnographer Richard Stoffle lift two rock covers off one of the tanks at the Twin Tinajas site.



Photo 20. Herbert Meyers (Moapa) points out chipping pattern on lithic material at Sever Tanks site.



Photo 21. Irene Benn (Moapa) discussing a grinding slab found at the large Sever Tank site.



Photo 22. Leslie Button (Lone Pine) investigates one of the small holes at Red Rockshelter site.



Photo 23. (From left) Woodrow Pete (Cedar City), Mary Lou Brown (CRI), Nedeem Naylor (Lone Pine) and Mart Snow (Shivwits) talk about the use of the large rockshelter at Red Rockshelter site.



Photo 24. DRI archaeologist Cari Lockett (left) and Pauline Esteves (Timbisha) discuss the functions of Twin Springs rockshelter.

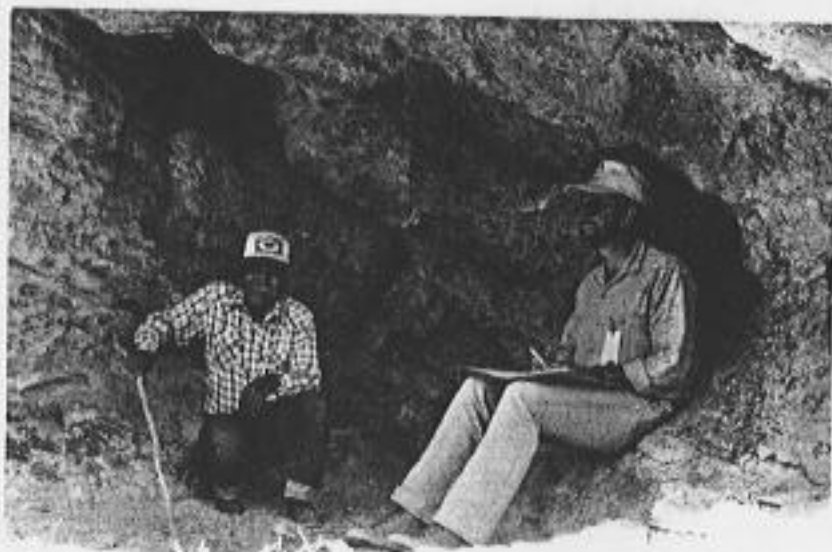


Photo 25. Hank Petterson (Timbisha) and ethnographer Richard Stoffle discuss two southwest-facing rockshelters at the Twin Springs Rockshelters site.



Photo 26. (From left) Dolores Gillette, Grace Goad and Hank Patterson (Timbisha) stand by a grinding slab found on the east slope of the Twin Springs Rockshelters site.



Photo 27. Marie Wilson (left, Las Vegas Colony) and Leslie Davis (Big Pine), at the top of Yucca Mountain orientation site, point across Crater Flat toward the Bare Mountains.



Photo 28. Vernon Miller, Leila Wilder (Fort Independence) and Cynthia Lynch (Pahrump) discussing plant resources at Ash Meadows.



Photo 29. Vernon Miller (Fort Independence) discusses the uses of the cane or reed plant (*Phragmites australis*) at the Big Spring site, Ash Meadows.

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